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Dr. Chas. J. Hastings

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Dr. Francis C. Wood

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PUBLIC HEALTH PUBLICITY: THE ART OF STIMULATING AND FOCUSING PUBLIC OPINION.

EDWARD A. MOREE,
Assistant Secretary, New York State Charities Aid Association.

I The Scope of Publicity.

PUBLICITY properly applied will save more lives than any other single agency employed by health workers. It should be entered in the Public Health Pharmacopœia as an accredited remedy for human ills. It is being applied to individuals in capsule doses of public health education. It is also being applied to masses of people over whole areas of country as public health agitation for far-reaching reforms and for needed new health laws or regulations and for the enforcement of laws already on the books.

Publicity prevents tuberculosis and builds hospitals to cure it; it saves the lives of children and controls epidemics of smallpox. Thousands of babies are today alive in New York State largely because big doses of publicity were administered to the public by the state and local departments of health, through exhibits, newspaper articles and lectures. One of the most important cities of that state endured an epidemic of smallpox that increased for a year or more. Then the State Department of Health announced that its policy in dealing with epidemics would be state-wide publicity. When the people of that city realized that their low health standards were to be advertised broadcast through the pages of the newspapers and would come to the knowledge of the people of the whole state whose lives were being menaced, the city officials soon found merit in the program of the state.

Nine out of ten people think of newspapers when you say publicity. This indicates the importance of newspapers in a publicity campaign; it shows that most persons get their information on public questions from newspapers and look upon them as the most important publicity medium. As the title of these articles suggests, however, publicity is to be discussed with a much broader field in view.

The Field of Publicity.

Publicity is actually any effort to make people think. It involves, besides newspapers, the use of exhibits, meetings, lectures, motion pictures, lantern slides, circular letters, pamphlets, reports, magazine articles, all forms of advertising including newspaper, billboard and placard, and last but not least, ordinary conversation.

Public health publicity is an effort either to change the lives and habits of the people or to focus or re-focus public opinion. The latter is often miscalled manufacturing sentiment or creating public opinion. There is no such thing as "manufacturing" public sentiment in health work. Public health opinion is founded upon the most fundamental and probably the most commonly recognized race instinct—self-preservation. There can be no two ways of thinking about saving life. There can be, and usually is, lack of thinking about it, however, and that is what the public health educator must overcome. He must get people to think and get them to think in the right way. He must stimulate and educate. He must agitate. Having stimulated and agitated he must then focus the interest of the people in health preservation, in sanitation and hygiene as means of prolonging life and adding to its enjoyment.

Creating or Stimulating Opinion?

The public is a collection of individuals. Public opinion is merely individual opinion in the mass. Public opinion is seldom recognized except when in motion. Setting it in motion is not creating it. There is of course such a thing as "manufactured sentiment," but not in health work. It is often necessary to "create" sentiment in certain fields of political activity. Sentiment for or against protective tariff does not exist until the tariff is discussed and those in favor of it fall away from the free traders, and the two groups form parties based on opinion. A hundred-million-dollar appropriation does not exist in public opinion until it is talked about and the need for the roads, the canal or the what-not is presented to the people. But with these the thought is put into the minds of the people. Human beings are not born with an instinct for a protective tariff or good roads or canals.

When the question is life or death, sickness or health, however, we are dealing with an entirely different psychological factor. Here we have a race instinct that needs only to be aroused and focused to be effective in securing action, either individual or collective. There may be cleavages of sentiment and divisions of opinion as to methods but there can be no differences as to the basic race urge toward life preservation.

There may be different opinions as to the amount of money to be appropriated for a given public health activity or as to the governmental unit to assume a public health burden but no difference of opinion can exist as to the desirability of saving life and preventing sickness. That question was settled when our ancestors were being chased over lava lakes by pre-

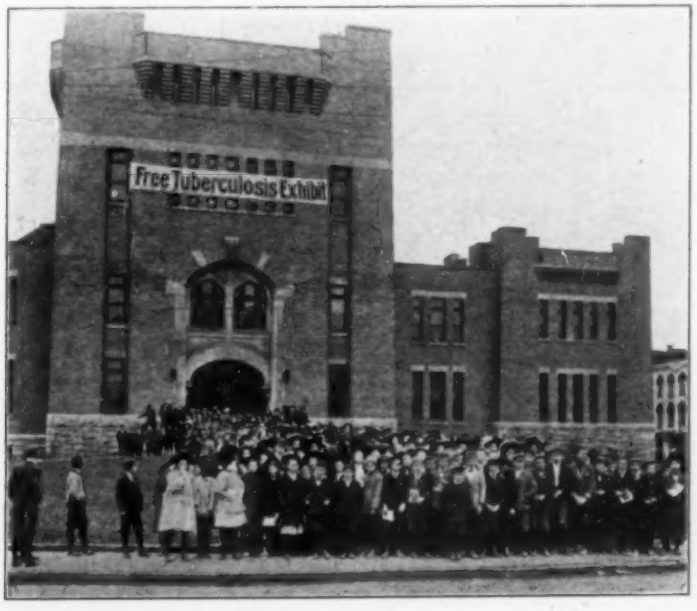
historic monsters. Our desire to escape a deadly micro-coccus is no less keen than was that of our ancestors to outwit the monstrous diplococcus.

One group in the community may honestly believe that a cavity in a lung is a mental error and not a hole. But all would want to heal all lungs with cavities in them and all would want to prevent everyone from getting the disease that caused them. One group might want to kill the germs that caused these by not thinking of them and not admitting their existence. The public health group, however, knows that germs do exist and it knows also that few if any germs have ever died from broken heart from being forgotten. Even the Christian Scientist, though, is as active in responding to the self-preservation urge, as the most ardent believer in the germ theory. If the Christian Scientists become dominant their public health campaign will be an effort to make people forget. Our present public health publicity, however, is to make them think.

How to Go About It.

Then how are we, as leaders, to make people think, to make them feel the fundamental race urge and to get them to act, individually and collectively through their agents in office?

First: By establishing our authority, our right to express an opinion as to the proper means of saving life and preventing sickness.



It required careful planning and well-worked out publicity to make this meeting of school children at the Syracuse State Armory an effective part of the tuberculosis campaign.

Second: By talking in as forcible language as possible and in as many ways as possible and to as many persons as possible.

Now there is no such division, as the above, either real or imaginary, in the execution of a public health publicity campaign. Assuming a sound scientific basis for a health movement, a department or an association officered and sponsored by persons whose reputations carry popular conviction, our very efforts to focus public opinion will establish our right to speak and our authority in the health field. The only way to establish the soundness of an opinion or a theory, so far as popular action is concerned, is to get the people to accept it. It is possible to establish authority even for error though fortunately such seldom persists. There may be objection to this but does anyone deny that Lydia Pinkham's vegetable compound has the active support of a considerable public opinion? Doctor Friedman won public opinion and succeeded for a time in his appeals to the instinct of self-preservation in the poor consumptive.

Truth in Publicity.

We must base our campaigns, then, if we are to succeed permanently, on scientific accuracy. Anything short of that is wasted effort if not actual fraud. I am not going to take much space, however, arguing for truth in publicity. I believe that I am safe in assuming that the fundamental virtues are as generally accepted and acted upon by public health workers as by other groups in our social fabric. When one argues for truth and scientific accuracy in publicity he is merely arguing for the employment of sound publicity method. The fakir may move the public but when the fake is discovered the fakir must move. When people discovered that mosquitoes and not miasma from swamps spread malaria the advocates of the miasma theory lost their authority. Publicity skill can never make a fake permanently hold a place in public opinion any more than a Raphael could paint a picture on a hole in a canvas.

And isn't that about all there is to it? If we are to retain our authority and be able to fill the first part of our bill we must urge public and individual action upon scientifically accurate statements that will work out. Truth in publicity is a part of wisdom.

The spectacular temporary successes of skillful publicity for absolute fraud in medicine and even in public health work show strikingly what may be accomplished by employing the correct publicity method and technique. Many an honest man has permitted the charlatan to monopolize the field of publicity. It should be remembered, however, that even a fakir may employ true *method*. Would an honest artisan be wise in not using a hammer because a burglar also uses that implement? Publicity dynamite is often employed by the assassins of truth but it is nevertheless mightily effective in blasting out the rocks of ignorance and indifference from the channel of social progress.

The Job of the Trail Blazer.

Now to go back a bit. To get the publicity usufruct from a sound theory you must get the people to accept it. A theory may be sound and yet the public may scorn it. Columbus had considerable difficulty with his theories. Pasteur was put to it to convince wine growers and silk worm culturists that bacteria were causing their troubles. The theories of these two trail blazers were as sound before they were accepted as now when the whole world is enjoying the fruits of their persistence. All trail blazers must secure a following or their pioneering is useless. And that is about the job of health officers or health associations —to establish authority as leaders and to base their calls for followings upon that authority.

Assuming, then, a sound scientific basis for a given health movement our problem becomes this: how may we inform our potential following of our authoritative position in the health field; and then, further, how may we so direct their opinions and energies that lives may be saved and that sickness may be prevented.

Accelerating Public Opinion.

When a certain lobbyist of notorious corporation connection announced on the witness stand a few years ago that his work had been that of "accelerating public opinion," the phrase was immediately taken up by the newspapers and became the subject of many highly critical editorials. The character of the work of that particular accelerator had been such that his association with his own phrase-child spoiled it for a time for legitimate use. Faulty environment is as bad for a phrase as for a child. Publicity has suffered from a most disagreeable environment. "Accelerating Public Opinion" is one of the most suggestive phrases in the English language and one that could be analyzed with profit by every public health worker. If this series can rescue the rhetorical waif and supply a better environment these articles will not have been written in vain.

Every person seeking to reach the public through the printed page or through the spoken word is an accelerator of public opinion. He may be accelerating it in the direction of advanced thought on public questions, or he may be accelerating it in the direction of so-called "conservatism." One is conducive to progress and the other to retardation. It is all acceleration of public opinion, however. It is moving public opinion in masses.

The Problem of the Merchandiser.

If our problem is to change the lives and habits of the people, to overcome individual indifference and to stimulate individual and collective action, it is identical with that of the marketer of merchandise. Every merchandiser is an accelerator of public opinion. It is his job to move opinion—usually individual opinion—in the direction of his particular article of commerce.

Take for example a man putting on the market a new brand of baked beans. To pay a dividend he must secure a national market for his beans. The profit that repays his efforts is

WILL YOU VOTE YES OR NO TO SAVE LIVES?

304 Persons Died from Tuberculosis in Jefferson County During the Last Five Years

YES ☒ SHALL THE COUNTY OF JEFFERSON APPROPRIATE THE SUM OF $25,000 AD-
NO ☐ DITIONAL FOR THE ESTABLISHMENT OF A COUNTY TUBERCULOSIS HOSPITAL?

YES MEANS

1. That you want to save the lives of the hundreds who are sick and dying from tuberculosis in this county.
2. That you want workers saved to industry—wage earners saved to their families—mothers saved to their children.
3. That you want to give the well—especially the children—the best possible protection against consumption by caring for the sick *in a place where they will want to stay* and where they cannot spread infection.
4. That you want this county to decrease the number of orphans and lessen the amount of poverty by taking the same step that 26 other counties have already taken.

ALL VOTERS (not merely taxpayers) may on Election Day, November 2d, declare their attitude toward stricken humanity.

This is how 26 counties are caring for their tubercular sick

NO MEANS

1. That you are not willing to do what you can to prevent deaths from consumption.
2. That you are indifferent to the costly burden which consumption now places on this county in preventable deaths, sickness, child dependency, and poverty.
3. That you vote for sickness, neglect and death, instead of health, scientific care and the saving of lives.
4. That you are willing to let this county lag behind the 26 which have already decided this question of humanity in the affirmative.

Mark your small hospital ballot before you leave the booth!

JEFFERSON COUNTY HOSPITAL CAMPAIGN COMMITTEE: Mr. T. W. Sackett, Cape Vincent, Chairman; Mr. Francis H. Lamon, Watertown, Secretary

Six column, 11-inch advertisement published in 49 newspapers in five counties in the county tuberculosis hospital referendum campaign in New York State. This advertisement reached 88,000 persons twice, and its arguments were in a large measure responsible for a favorable total majority in the five counties of 20,825 votes. There was a larger total vote in three counties on the hospital question than was polled by the chief candidate on the regular ticket. The cost of this advertising in the five counties was approximately $660.00. A circular letter going to a list of 88,000 only once, would cost $3,520 without an enclosure. With an enclosure the cost would be $4,200; twice with an enclosure would cost $8,400 as against $660—the cost of the advertising.

dependent almost entirely upon the amount of money spent and the intelligence displayed in his efforts to accelerate public opinion in the direction of his particular brand. He is not trying to move people in masses, but merely to convince individuals, that his particular brand of beans is a better brand than has ever been put on the market. His problem is almost exactly the same as that of the health department that must convince individuals that fresh air, good food, personal hygiene, vaccination, inoculation against typhoid and the use of antitoxin will aid in prolonging their lives.

The bean man must establish his authority as a manufacturer of baked beans. The health worker must establish his right to give advice. The bean man secures purchasers for his

beans. The health man secures action on his advice.

Mass Opinion in Merchandising.

Consider for a moment, however, the man who has invented a process of manufacturing an entirely new article of food—let us say bean butter. He has found that ground beans and olive oil are so superior to the ordinary bean product that he believes he can make it a national institution much as baked beans are a New England institution.

Here we have an entirely different problem. The inventor of the new food must accelerate public opinion almost to the point of securing mass action. He must cause his bean butter to be discussed in the magazines, on the lecture platform, in women's clubs, and make it the subject of conversation in households all over the country. All his efforts, of course, are directed ultimately to bringing about the purchase of his bean butter by large numbers of individuals. He must, however accelerate mass opinion and not merely individual opinion, as in the case of baked beans. This is called an educational campaign in commercial advertising.

The bean man must force his bean butter idea into the thought of the people. The health worker, with compulsory vaccination, the use of diphtheria antitoxin, the need for advanced health legislation or adequate appropriations as his problems, is not compelled to force in a new idea. He must merely stimulate the self-preservation instinct, and focus it on the proper means of meeting its demand.

Publicity as an Art.

The two merchandising problems are as old as modern business. The solution of them has become an art. Mercantile publicity has indeed become such a highly developed and highly specialized art that many advertising experts insist that it has approached, if not actually reached, the realm of science. It certainly is true that many of the principles of mercantile publicity have been so thoroughly established by long practice that at the present time experimentation in advertising is rare.

Social service publicity, though, is in its infancy, relatively. For years, of course, more or less sporadic efforts to secure newspaper notice have been made by public health men and social service workers. With the rapid development of social service activities and the tremendous increase in the number of organizations clamoring for public notice, it behooves all of us to waste no time in experimentation where publicity principles have been established by a considerable experience.

There is little place today in the field of social service acceleration for the amateur publicist. He damages not only his own cause but gets in the way of traffic and makes it more difficult for even the skilful to succeed. The amateur who finds himself confronted with some problem of social service acceleration will advance his own cause and do less damage to the whole cause of social reform if he applies to his work the well established principles of publicity calls into play

Public health education in the home. A tuberculosis visiting nurse instructing a patient.

all the judgment at his command. Every social service campaign should receive as careful consideration as is given to a merchandising campaign.

Most of us are familiar, some from dire personal experience and others from observation, with public reaction, that sword of Damocles, which threatens all social service effort. Practically every instance of public reaction against a social reform is traceable to ill-considered publicity campaigns and faulty publicity method. The amateur wants to stampede something. A stampede is easily started. It seldom produces anything but disaster. Too many social service publicity campaigns try to start a stampede. Such attempts are either abortive, and injure, more or less seriously, the whole field of social service work, or they are too successful to result in real, constructive, lasting reform. Many "reform movements" are founded on sociological or economic error, and fail. This series is not a guide to social reformers nor a hand book for amateur philanthropists. It assumes merit and tries to show how to secure its recognition.

In public health work, which is comparatively new, it is important to recognize and practice the established principles of public opinion acceleration. It is possible for those of us in active health work to avoid the pitfalls into which other social service workers have fallen.

What is an Agitator?

Let us begin by not being frightened by the English language. Let us

Map shows in white the thirty-two counties of New York State (outside of New York city) with tuberculosis hospital provision in operation or assured. Carefully planned publicity and thorough organization produced the above results.

recognize that if we are to be successful in the field of public health publicity we must be successful agitators. Against the advice of numerous friends whose judgment I value, I have adopted, as descriptive of my own work, the title "agitator." I believe that it is the most apt word in the English language to describe the work of a publicist. The term has fallen into disrepute because of its association with unsuccessful or faultily conceived efforts to accelerate public opinion. An agitator is merely that which, or one who, stirs things up.

We all know the "perfectly good" citizen who is always on the right side of public questions, who always votes against the "machine," and who signs petitions and writes occasional letters to the mayor, the governor or the legislature urging good things in politics and reform.

Some day, this good citizen may realize that his duty is not merely to be a "good" citizen; that in order to be a citizen in the best sense he must try to convince others to vote with him for the men representing the principles that he stands for, and to get other

citizens to think on public questions as he does. He may then become the "pro Bono Publico" who writes volumes of letters to the newspapers, unread except by the long-suffering editor; or he may become a real force in the community, through the practice of intelligent methods of focusing public opinion. The moment his efforts become effective in swaying the opinions of his fellow citizens he becomes an agitator.

All that is necessary to become an agitator is to begin to stir things up. It makes no difference whether you agitate from the head of a barrel on the street corner or agitate through news, editorial and advertising columns. You are an agitator just as soon as you begin to try to change the opinions of the people on any given subject, whether it be pickles or public health.

Professional Agitators.

If you are extraordinarily successful as a private citizen in your chosen field of agitation, groups of your fellow citizens may decide that your services are so valuable to the public that they want you to devote your entire time to the job of accelerating public opinion. They collect private funds or secure your appointment to a public post so that you may make agitation your main job. Then you immediately become a "professional agitator."

"Professional agitator" is one who is stirring up public opinion and focusing it on a cause that he and a group of his fellow citizens consider good, and is getting paid for doing the work.

"Brass band methods" of publicity in the tuberculosis campaign have been criticized but this particular band filled a large state armory with people who listened to addresses on tuberculosis.

Among professional agitators, by vocation or avocation, are ministers, school teachers, peace advocates, presidents, governors, legislators and other politicians.

Stimulation of public opinion is a profession. The development of the printing art and the popularization of newspapers; the development of advertising, motion pictures and of the Chautauqua, and the lyceum lecture business has put a new aspect on the business of acceleration, even in the political field.

The importance of the profession has grown with the improvement in means of human communication. Today newspapers, telephone, telegraph and improved transportation, have made it possible to talk to millions in a day where in the early days hundreds might have been reached in a week, from the stump. Old publicity methods are disappearing and those who cling to them are disappearing with them. The torchlight procession has almost gone from political campaigns. The platitudinous cart-tail orator is going out of business. The hard-fisted, table-banging, bull-necked boss is no longer an effective vote-getter. His publicity value is chiefly as a witness at his own trial. The party that wins today wins by a few well-organized, carefully planned political meetings at which men who can really discuss the issues do the talking; by intelligently prepared newspaper advertising; by billboard pronouncements and the direct appeal to the voter through business-like circular letters. The same is true of public health publicity.

An Example of the Old and New in Agitation.

One man in New York State recently set out to defeat the constitution. Others were trying it by scattered fire and antiquated, ineffective methods. His work was one of the largest factors in accomplishing its defeat—desirable or undesirable as it may have been. He spent some $50,000 or $75,000 in newspaper advertising and nullified the several hundreds of thousands that the taxpayers of the state had spent on the election and the convention that framed the document. If the state itself, or if the group of high-minded citizens who at great personal sacrifice were urging the adoption of the constitution, had recognized the necessity for the application of present-day publicity method, the result might have been far different. The time has passed when a cause will win merely from the force of the character of the men advocating it. Method and not personality wins.

The professional man is slowest to recognize need for new methods and adopt them. To maintain his standing the professional man must be conservative as to professional matters. But physicians in public health work must recognize the fact that the "public" part of the work removes it in many respects from the realm of medical practice into a realm where a different order prevails. In this new realm a new profession has been rapidly developing methods and standards that are fully as important as those which we all venerate in the medical profession. The man who clings to

preconceived notions as to publicity and fails to recognize its principles and practice its technique simply cannot function as a public health worker, except in the laboratory.

This is the real reason why, every year, we see an increasing number of old departments passing into the limbo of the forgotten while their places are being taken by departments reorganized for real public health work—with the public accented.

The author of this series is not striving to become the Billy Sunday of public health publicity. No one will be invited to hit the publicity trail and enjoy the heaven of perpetual public approval. He purposes to draw upon ten years of active newspaper and publicity work and five years of experience in social service acceleration and hopes that where he failed you may win—where he made big blunders you may make little ones or none at all.

TYPHOID FEVER REDUCED IN RURAL COMMUNITIES.

Reduction in typhoid fever and improvement in sanitary conditions have followed the intensive investigations of rural communities carried on by the United States Public Health Service in coöperation with local and state health officers, according to the annual report of the Surgeon General of that Service. During the past fiscal year 16,369 homes in eight different states were visited and many of them re-visited. In each of these homes information was obtained as to the prevalence of disease and insanitary conditions and a complete sanitary survey of the premises conducted. This was followed by reinspections to determine if remedial measures had been instituted. In but a relatively small percentage of the cases did the persons concerned, after having their attention drawn to the danger of a particular unhygienic condition, fail to inaugurate corrective measures. Stimulus was given to the work by means of public lectures, the formation of active sanitary organizations, and the enlisting of all public-spirited citizens in the campaigns for reform. Public buildings were also inspected and local authorities given expert advice in solving such sanitary problems as the disposal of excreta, the prevention of soil pollution, and the maintenance of pure water supplies.

The surveys made during the year 1914 had shown that in rural communities less than 1 per cent. of the homes had sanitary toilets and that more than 50 per cent. of the people were using water from polluted sources. This condition, according to the Public Health Service, made the rural sanitation question loom large among the matters vitally affecting the welfare of the nation. Following these studies and as a result of the interest aroused, the typhoid fever rate, an excellent indicator of the sanitary status of a community, has in some places frequently been cut to one quarter of its previous figure. In Berkeley County, West Virginia, the cases of typhoid fever were reduced from 249 to 40 in one year. In Orange County, North Carolina, the rural sanitation campaign resulted in a reduction of the cases from 59 to 17.

The tangible results of operations in rural sanitation indicate that marked advancement in maintaining hygienic and satisfactory surroundings in country districts is possible by the application of the common principles of preventive medicine. Insanitary conditions exist largely because they are not known to be such. Actual demonstrations of their harmfulness, together with definite recommendations for their correction, remain one of the most gratifying and successful methods for instituting reforms and has been, in the experience of the Public Health Service, invariably accompanied by definite and measurable results.

THE VALUE OF A CREDIT BALANCE IN PUBLIC HEALTH ADMINISTRATION.

CHARLES J. HASTINGS, M. D.,
Medical Officer of Health, Toronto, Ontario.

WHEN one recalls the statement made by Ruskin many years ago, that "any interference which tends to reform and protect the health of the masses is viewed by them as an unwarranted interference with their vested rights in inevitable disease and death," one's sympathy at once goes out to a people so primitive and so superstitious; but after a brief introspection we might with advantage conserve some of our sympathies until we have, in the light of present knowledge, analyzed more carefully present methods of public health administration, and then decide how far we are removed, what advances we have made.

Preventive medicine has dragged its slow length along down through the centuries. Many of the advances under the Mosaic and Roman dispensation were submerged through ignorance and suspicion until the discovery and acceptance of the germ origin of disease, and its progress even since then reflects but little credit on its exponents. It is true that we have had sporadic outbursts of enthusiasm, when some new scientific discovery has been made: When Jenner perfected his vaccine we were enabled to control smallpox; when Pasteur perfected his prevention for rabies; and when Lister introduced the principles of antiseptic surgery, over half a century ago, notwithstanding the indisputable evidence this contained of the possibilities of controlling the transmission of infection, nearly half a century elapsed before the medical profession woke up the fact that the same principles were applicable to medicine; and I presume if it had not been for our esteemed and worthy chairman, Doctor Chapin, and his co-workers, some of us might still have been slumbering in this respect.

Later on, through the united research of Laveran of France, Sir Patrick Manson and Sir Ronald Ross in Great Britain, and Reed and his colleagues on this continent, it has been made possible to practically exterminate malaria and yellow fever. In this connection, as an illustration of what a statesman can do in the field of prevention, one recalls the experience of Mr. Walter Long, who, when Chief of the Local Government Board, succeeded in having a muzzling order enforced—eighteen years ago in Great Britain—since which time there has not been one case of hydrophobia in either man or dog throughout the whole United Kingdom. Long was the type of a statesman who could stand firm against a withering fire of criticism and abuse.

During the intervals of these scientific discoveries what have the administrators of public health been doing? Have many departments of health not been wasting valuable time, energy

and money in the collecting and disposal of garbage, street cleaning, plumbing and drain inspection, the abatement of nuisances, etc., problems that have little or no direct bearing on the cause or prevention of disease? It is true that many departments of health have relieved themselves of these unnecessary burdens. Why should administrators of public health be burdened with these administrations and have the expense connected therewith charged up against public health administration, thereby materially diminishing our credit balance? Obviously, street cleaning and garbage disposal should be under a separate department of civic administration; plumbing, etc. under the architect's department; and sewage disposal and water purification are engineering problems and should be under the works department. However, the supervision of installation and the efficiency of administration of both the sewage disposal and water purification should be determined by the laboratories of the Department of Public Health.

A careful consideration of these duties is imperative in view of the fact that the inadequacy of public health administration in many states, provinces and cities is due to insufficient appropriation. Have we not been doing many things that we might well have left undone, and neglecting many of the real issues in our administration? And while much has been accomplished, yet, for the most part the appalling sacrifice still goes on. We meet in these Conferences year after year, become enthusiastic as we exchange ideas with our colleagues, but do we take this enthusiasm home? Does it cause us to speed up throughout the year? Are we preventing these preventable diseases? What are we doing to enlighten the public and to awaken them to a sense of their duty? It is not the epidemics we control but the epidemics that we prevent that help to give us a credit balance at the end of the year.

Unfortunately, from time immemorial—whether it be in the slums, where oft times we find the landlords extracting blood money with a personality even smaller and more contemptible than are the habitations the slum dwellers are forced to occupy, or in the various industries—in fact almost at every turn we find in blazoned letters "man's inhumanity to man." But, fortunately, the tide is turning. As one of your governors of a state recently said in a public address—"The expense to the nation from deaths that never should have occurred, has been calculated as eight times the loss from flood and fire. Should the prevention of this loss be in politics?" Continuing, he said, "We are going to realize that this is a new era, an era in which humanity stands before property; the political wall is growing lower and regard for human rights is growing higher."

A prerequisite to advancement in preventive medicine is an absolute divorcing of public health work from politics. That this may be accomplished, we require more statesmen and fewer politicians. There have been statesmen in all ages and in all nations who have had visions of the future of preventive medicine that are

only now beginning to be realized. An enormous amount of money has been spent by our governments yearly in agriculture and stock because they have a monetary value. It is, therefore, given to us to demonstrate that human life and human efficiency have a monetary value, and that no nation can afford, from this standpoint alone, to disregard it. While students of political economy, both on this continent and in Europe, have differed somewhat in estimating the value of human life and human efficiency, yet this has been more in methods of reckoning than otherwise.

It has been conservatively estimated that preventable diseases and death cost the United States and Canada annually from one and one-half to two billion dollars. This is based on the very conservative value of a human life being placed at $2,900, though our courts place this valuation at $5,000. Time will not permit of my entering into detail in regard to this, but I would advise those who are not familiar with these details to read the valuable report prepared by Prof. Irwin Fisher, together with the authors therein referred to, the careful perusal of which will amply repay you.

Sir Thomas Oliver, in an address on "Dust and Fumes as Foes of Industrial Life," before the Congress of Hygiene and Demography, pointed out that the aggregate cost of illness due to occupation alone in the United States amounts to $772,892,860 per annum; and this is for the most part preventable, but will not be prevented until our legislative bodies realize that the people, and the physical and mental fitness of the people, represent the most valuable asset of the nation or municipality. In fact they constitute the very basis of economic productivity, but unfortunately this is being exploited in consequence of our ever increasing industrialism and the urbanization of our people. Yet, we were told years ago by Pasteur that it is within our possibilities to rid ourselves of all parasitic diseases, and we have reason to believe that with a proper and intelligent application of the knowledge we now possess that human life could be lengthened from fifteen to twenty years.

What are we doing to stem the tide? What are we doing intelligently to apply the knowledge we now possess to postpone old age; to prevent premature hardening of the arteries, that is dependent in a measure at least on auto-intoxication resulting from defective metabolism, due in a large measure to unnecessary worry and over-feeding, instead of regulating the fuel to the failing capabilities of the engine?

What are we doing to combat undue fatigue and minor ailments, the conditions that give rise to the familiar expressions—"I don't feel very fit"; "I am out of sorts"; "I'm on the rocks"? All these mean lowered resisting powers, increased susceptibility and probably 10 per cent. of a loss in efficiency and in labor.

What are we doing to control industrial diseases? This is probably one of the most lamentable, neglected branches of preventive medicine. It must be apparent that industrial hygiene is an essential part of the com-

munity hygiene and therefore comes under the régime of the Department of Public Health.

The term "industrial disease" as we use it embraces the results of the general unhygienic conditions in factories, work-houses, warehouses—badly lighted, over-heated, improperly ventilated and oft times with a dust-laden atmosphere; and for obvious reasons trade dusts are much more dangerous when inhaled than is the ordinary dust of the street. All these tend to lower the vitality and, therefore, lower the resisting powers of the body, thereby rendering the individual an easy prey to infection which he may be exposed to by close contact with possibly one suffering from tuberculosis or one convalescing from some other communicable disease, or perhaps a chronic carrier of one of the most common communicable diseases.

Under these circumstances one has little chance for escape. On the other hand such environments only hasten on a fatal issue with those unfortunates who are already the victims of some of the aforesaid diseases, and who, through ignorance of their conditions or the danger of their environment, or through dint of circumstances, are compelled to face the inevitable.

Secondly, we have the morbid state consequent upon the occupation or trade giving rise to these specific diseases. This I shall not dwell upon, as the subject is being handled in another paper on the program. It has been estimated that at least 50 per cent. of the occupied that die might be saved by the adoption of proper sanitary measures and proper safety devices. Well might we be asked by the enlightened public—"If these conditions are preventable, why not prevent"?

What are we doing to control the ravages of venereal diseases? This is another lamentable, neglected field of preventive medicine. It is the opinion of investigators and those who are competent to judge, that venereal diseases constitute probably the most important of all factors in the degeneration and depopulation of the world. As Wilson expresses it in speaking of these diseases—"The intelligent and the stupid; the moral, immoral and unmoral; the innocent and the guilty are paying the penalty of centuries of an ignorant, ill-considered, false modesty, in terms of morbidity and mortality that probably surpass the amount of all other communicable influences combined."

If a computation were made of the acute venereal affections and their sequelæ—the brain and cord lesions; the insanities and idiocies; the inherited and acquired deformities; the destructive lesions, the partially and totally blind, the abortions; the still-births; all the abdominal operations on the innocent and the guilty,—the findings would be appalling. These constitute only a few of the points by which social diseases impinge both on the innocent and the guilty portions of society.

What venereal diseases represent in the lower working efficiency of our population, to say nothing of the still more important subject of an increased mortality, it would be difficult to estimate; and yet, the feature which casts the most reflection upon

our intelligence is that these diseases are preventable and yet practically no effort is being made to prevent them. In my judgment, if departments of health are going to handle these problems efficiently they must be entirely divorced from the social aspects and treated as any other communicable and preventive disease.

What are we doing to control the enormous increase of our insane? What are we doing to relieve this continent of the stigma of being dubbed "the home of the neurasthenic—the home of the neurosthniæ"? To what extent are these conditions responsible for the lamentable increase of insanity?

Sir James Crichton Brown in an address some four years ago made the following statement: "The broad fact remains that the number of registered lunatics has marvellously increased and is still increasing. The explanation of this is, from any point of view, to be found in the strain and stress of the age in which we live. It will not be disputed that during the last century the possible causes of nervous disturbances have increased prodigiously.

"The tendency of civilization has been to transfer the burden of breadwinners for the masses of the people from the muscles to the nerves. In the era of competitive business the victory is now to the vivid and to the nervous, not to the stalwart or the brawny. The introduction of machinery into every branch of industry has made life at once more monotonous and irritating, and in some industries the policy of 'speeding-up' has been adopted with increased closer work and fewer intervals of rest, and is, therefore, peculiarly exacting and exhausting.

"The diffusion of education has widened the periphery from which stimuli of every kind may reach the brain. In response to our ever-shifting kaleidoscopic surroundings, we have become more fretful, mercurial, wayward and impulsive than we used to be, and suffer more from what may be called 'brain-fidgets.' It is certain that we are more 'jumpy' than we used to be; have to be more on the alert and so make sharper demands on our nerves, and are prone to those nervous breakdowns that lead up to mental disorder.

"We have been crowding our people into towns where hustling and nervous agitation are inevitable. We have been bringing up our babies on anything but mother's milk, and by the employment of women in many industries, have curtailed that family life in which the young nervous child best gains and thrives. We have been cultivating emotionalism and eagerly pursuing all kinds of pleasurable excitement, while we have narrowed our horizon and lost sight of some of those ideals that helped in the past to maintain a nervous and mental equilibrium. Notwithstanding all our improved economic conditions, we have not yet, as regards the nervous system, succeeded in reconciling modern civilization with biological processes. It is of course only by further economic social, sanitary and ethical reforms that the great nervousness of our age is to be abated."

These statements were well borne out by Dr. F. W. Mott, Pathologist of

the London County Asylum, in an address delivered before the Royal Sanitary Institute, in which he said: "A neurophatic heredity is the most important cause of insanity." This surely affords another fruitful field for educative work in preventive medicine.

What are we doing to control the ravages of cancer? It is estimated that over 80,000 lives are sacrificed annually in the United States and Canada by ravages of this dread disease, and yet from 50 to 75, or even a higher per cent. of these lives might have been saved by early diagnosis, early treatment, or by operating, if possible, in the pre-cancer stage. Inasmuch as it is the duty of administrators of public health to educate the public on all matters pertaining to prevention, the control of this dread disease obviously comes under the régime of the department of health. After the age of 35 or 40 it plays a very much more serious rôle than does tuberculosis.

Can we longer afford to disregard these problems? Are we guardians of public health awake to our ever-increasing responsibilities?

I have endeavored in the foregoing to draw attention to what in my judgment constitute the rocks and shoals upon which tens of thousands of lives are being mentally, morally and physically shipwrecked every year and upon which we are expected to place the beacon lights.

Is our shortage of appropriation which we so much deplore, the fault of our municipal government or the ratepayer, or have we failed in our methods of presenting our case? Have we shown a yearly credit balance? Have we delivered the goods? Have we so democratized the knowledge that for years has been kept within the precincts of our colleges and laboratories, that it can be easily assimilated by the man on the street, or by the housewife in the humblest home?

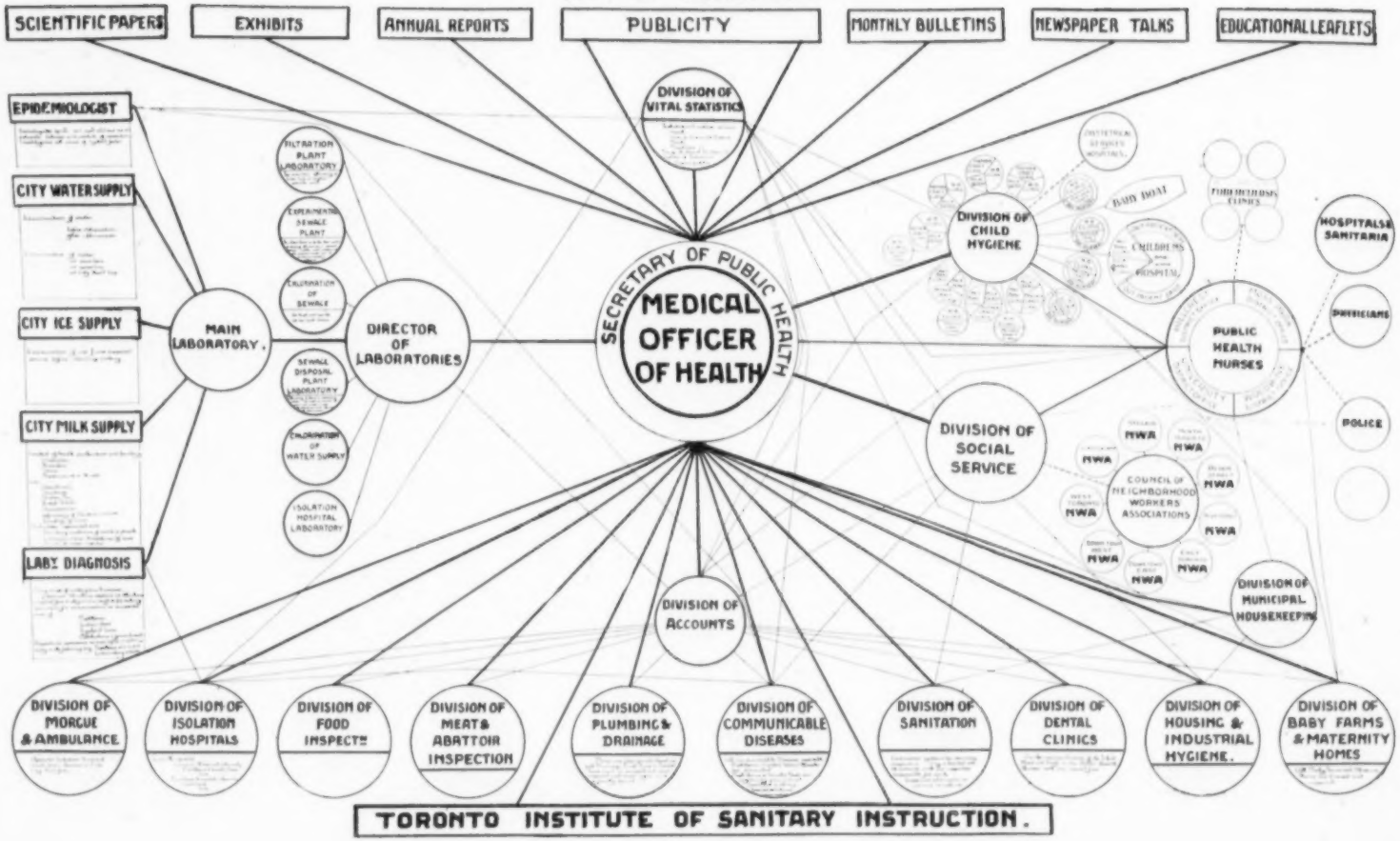
In my judgment, the first duty of a department of health is to educate the public: enlighten the public through the press and by our health bulletins; by public addresses, and if it is necessary to resort to brass band methods, do so. Educate at any cost. Every citizen is entitled to know what we are doing and why we are doing it, and in return the enlightened public will demand a higher degree of efficiency. They will demand that if these diseases are preventable, that they be prevented, and with an enlightened public sentiment behind us, we can get anything.

When Cobden was fighting in the British House of Commons for the repeal of the Corn Laws, he once said: "I have come to the conclusion that if you want to get anything through the heads of the British people, you have to repeat it over and over again." I presume that statement will find pretty broad application. It is not limited to the British House of Commons. It has taken over half a century to instill into our surgeons the principles of antiseptic surgery and there are delinquents yet.

In addition to the foregoing methods of educating the public we must get closer to the people. If the mountain will not come to Mohammed, then Mohammed must go to the mountain. There are tens of thousands of

DIAGRAM OF ORGANIZATION

DEPARTMENT OF PUBLIC HEALTH
CITY OF TORONTO.



wives and mothers in all large cities, who for want of time or other reasons, don't read and consequently must be reached in some other way. This we think can best be accomplished through our Division of Public Health Nurses, our Division of Social Service and our Division of Municipal Housekeeping. Medical inspection of schools in Toronto is under the Board of Education. This, for obvious reasons, is a mistake. Departments of health are responsible for the health of all citizens from their prenatal state until they pass on to the next cycle of existence. They should, therefore, not have their hands tied at any intervening stage. Dividing of responsibility is not good administration, is not good economy and does not make for highest efficiency.

In the beginning of our present administration of public health in Toronto in 1910 we had one health nurse. We now have forty-four (44), and the city is divided into five (5) districts with a supervising nurse placed in charge of each district. We first had a tuberculosis nurse only; then tuberculosis nurse and child welfare, etc. Today our public health nurse embraces the tuberculosis nurse, the child welfare, child hygiene, the sanitary advisor and the social agent. In other words, she specializes in the home and not in disease, which means one visit to the home where two, three and four were formerly made. The nurses attend the clinics, the crèches, the milk depots, the Neighborhood Workers and all other medical and social organizations. They follow the cases to the homes, study the social conditions in the homes, ascertain if there are others in the home requiring medical care; educate the mother on home sanitation, the care of the babies, the dangers of infection, the value of fresh air and sunshine. If a social problem is found, and there usually is, it is referred for its solution to the Neighborhood Workers or some other social agency.

In order that our nurses might be properly guided in the social aspect of our work, we employed over a year ago a trained social worker, a graduate of the New York School of Civics and Philanthropy. He is now Chief of the Division of Social Service. The nurses are also being trained in sanitation and domestic science, which information in turn filters through them to the mothers in the home. These divisions, together with the Division of Child Hygiene, have succeeded in correlating practically all the medical and social agencies in the city and, though they march apart yet they fight together, and are a most valuable asset of public health administration.

In the Division of Municipal Housekeeping the women visit the homes in the poorer districts of the city, instruct the mothers on all phases of sanitation in the home, better methods of living and domestic economy. They generally improve sanitary conditions around the home, and encourage the establishing of flower and vegetable gardens in the yards, which have for years been utilized as a storage for all sorts of refuse. Many of these yards have during the past two years been laid out in flower and vegetable beds and the neighbors seem to be vieing with each other as regard the choice

and variety of the flowers and plants. These women are sanitary instructors, not inspectors.

Toronto's mortality rate from the more acute communicable diseases, typhoid fever, diphtheria and scarlet fever, for the first ten months of 1910 was 110. For the first ten months of 1914 it was 28.3. The general death-rate for 1,000 population in the city for the first ten months in 1910 was 14.0; for 1914 it was 11.5. This decline has been gradual year by year. This, at the accepted value placed on a human life, gives us a fair credit balance. Then we have the saving of sorrow and tears; the saving in high efficiency and many other items as a clean profit. These facts, together with an enlightened public, we feel is responsible for the appropriation of the Department of Public Health in Toronto in 1910 being $85,388, and in 1914, $277,958. The employees of the Department in 1910 numbered 76 and in 1915 they number 225.

It was the increased appropriation that made this possible, but, on the other hand, it was the enlightening of the public and the presenting to them of a yearly credit balance in life-saving, that secured the increased appropriation.

FULL-TIME HEALTH OFFICERS.

The necessity of health officers giving their full time to their official functions is pointed out by J. W. Kerr, Washington, D. C. (*Journal A. M. A.*, Nov. 6, 1915). In this country he says the health service has been a plant of slow growth, stimulated mainly by epidemics. The funds appropriated have been too adequate and the conditions all over the land have been bad. In Kansas, for instance, there were no full-time health officers prior to the present year and in Illinois, with the exception of the city of Chicago and La Salle, Peru and Oglesby, which have joined forces, there are, so far as reported, no full-time health officers at present, and only 106 paid health officers in the state, some of these receiving only $5 a year. While local health administration should be the strongest defence against disease, it is in reality the weakest in our national resources. The federal or state governments cannot be expected to act locally except in special emergencies and normally should only exercise advisory and supervisory control as regards local matters. Authority has been dissipated and intrusted to separate boards and commissions to the damage of public health in general. It would be advisible to have more joint action between communities, several jurisdictions combining to support health officers that can give all their time, and only this will give us efficient local health administration. In Germany, he says, he found by inquiry that the imperial government, while authorized to act, had found it unnecessary because of the efficiency of the local health authorities. Recent legislation in several states is reviewed by Kerr and some progress has been made toward having efficient local health boards, especially in certain states, such as North Carolina and Massachusetts and in proposed legislation in others. Such legislation should be encouraged.

CANCER AND THE PUBLIC HEALTH.

FRANCIS CARTER WOOD, M. D.,
Director of Cancer Research, George Crocker Special Research Fund, Columbia University.

Read at the Symposium on Death-Rate of the Higher Age Groups, American Public Health Association, Rochester, N. Y., September 9, 1915.

This article by Doctor Wood is especially interesting to health workers and indeed to all readers of the Journal on account of the fact that it treats in a concise manner some of the fundamental points of importance known at the present time regarding this devastating disease. It is particularly suggestive as it indicates various ways in which state and local health authorities can direct their activities so that the people may be informed of the fact that early cancer is curable in most instances.

WITH investigations of the cause and attempts to discover a cure for cancer, those who are responsible for public health duties have but little concern. These phases of the cancer problem belong largely to the laboratory. Neither are they interested in the clinical study of human cancer after it has developed. That is a matter for hospitals and institutions endowed for such a purpose. For it is not likely that many states will feel called upon to establish and generously to maintain a laboratory and a hospital devoted to the abstract investigation of the cause of cancer in animals, and its detailed study in wards filled with human cases of this all too frequent disease, as has so admirably been done by the state of New York. Most states are still more interested in the diseases of cattle than in those of man, as the endowment of agricultural schools and stations shows. If such facilities should become generally available, an enormous field of investigation would be at once opened, one far more complex and difficult than that of contagious disease, heretofore quite properly the main interest of the public health laboratories. I cannot enter at this time upon a detailed enumeration of such aspects of investigation. The records of any one of the large endowed cancer laboratories in this country or abroad will furnish ample food for thought to the interested. The main lines are, aside from the cause, hereditability, contagion, and finally, what most interests us all, the production of a protective immunity and an ultimate medical cure as distinct from the present mutilating surgical procedure.

Public health officials, however, have two very important and immediate opportunities in connection with this disease: (1) The supervision and study of the records of large numbers of cases from a statistical point of view; and, (2) The education of the public by bulletins, lectures, or demonstrations, preferably in collaboration with county or state medical societies, as has recently been done in Vermont.

What we know about cancer today

is relatively small in amount, and there are many problems for the elucidation of which further data are needed. The collection of such data must be begun at once in order that the material may be ready for final study ten or twenty years from today. That our statistics are now extremely defective is generally acknowledged. The Census Bureau has had to send some 35,000 letters to physicians asking that they make fuller and more accurate returns in cases of cancer, but, even should these records be completed as requested, the data so available would be far behind those of European countries. The statistics of hospitals, alone, are of but little value, because they cover only material selected geographically, and cannot be considered as accurately representing the normal population of the district in which the institution is situated. Such statistics give us only the proportions between the kinds of cancer which occur and cannot furnish anything of value concerning organ distribution; since, for example, a disproportionate number of patients with cancer of the stomach, or of the breast, or of other organs, may be attracted to a hospital because of the reputation of a particular surgeon as an expert operator in malignant growths of these regions. The real need is for accurate statistics by counties, as well as by states, in order that it may be determined whether there is any local variation in the different portions of a state, owing possibly to the influence of climatic conditions, soil, moisture, drainage, etc., on the occurrence of cancer. To secure valuable statistical results, however, there must also be the collection of accurate census information as to the general population of the district, and the age and sex distribution; and in many states such information has not yet been obtained. When these data are once recorded, they can be used for larger purposes and are available for the publications of the Census Bureau.

The popular view that "cancer states," "cancer districts" or "cancer villages" exist has unfortunately been fostered by physicians unacquainted with statistical methods. Much has been done in England by the Imperial Cancer Research Fund and by the Registrar-General in their reports to explain the occurrence of large numbers of cases of cancer in certain districts by a study of the age distribution therein. Cancer being a disease of advanced life, it is usually found that such districts contain a large proportion of older people. In this country this is particularly marked in the New England States, Vermont and New Hampshire especially having high cancer death-rates; and the condition here can be ascribed chiefly to the drift of the younger population to the large cities outside of these states, and not to inbreeding or greater liability of the inhabitants themselves.

The study of the race distribution of cancer is also one of the important but as yet unsolved problems of this subject, and it rests upon the Southern States, with their large proportion of negroes, and upon the Western, with their still considerable Indian population, to assist in furnishing data for the elucidation of the questions of

frequency of occurrence in general, as compared to the white races, the proportional appearance in organs, and whether or not any absolute increase is going on in these limited race groups.

The interest of public health officials in occupational diseases is now widespread, and it is of the utmost importance that any correlation between a particular occupation and the occurrence of cancer be carefully investigated. It is well known that the workers in brass foundries are liable to cancer of the upper extremities, chimney sweeps and briquette workers to cancer of the scrotum, those employed in the manufacture of certain synthetic coal tar products to cancer of the bladder, and X-ray operators to cancer and leukemia; but there are many occupations as to which no information of this sort is as yet available, and this can be obtained only through the authority of state boards of health and with the concurrence and active interest of health officials. The importance of records of this sort in determining the rates for industrial insurance and workingmen's compensation is obvious, though apart from the cancer problem.

Writers differ greatly in their published statements concerning the correlation between trauma and malignant disease. The tendency in the past has been to assume that even a single injury may cause a cancer; but recently this view has been challenged from many sides and it is now generally believed that a single injury, unless it produces prolonged ulceration, as, for example, an X-ray burn, is of little importance in the genesis of cancer; it is thought rather that only long continued irritations extending into adult life, that is, the period of susceptibility to cancer, are of any influence. The medico-legal interest in these facts needs no consideration here. With the data which will gradually accumulate from the Employers' Liability laws, it may not be impossible to cast some light upon this supposed relationship within the next twenty years, but the work must be started now in order that sufficient facts be available later.

With the increase in the laws regarding notification for venereal disease, and the general employment of the Wassermann test, it is beginning to be possible to study the relationship between cancer and syphilis. So far attention has been directed in this connection chiefly to cancer of the tongue, which seems often to have a syphilitic basis. In addition the relationship between cancer, syphilis, the excessive use of alcohol and of tobacco can be studied much better from broad general statistics than from the collection of small numbers of cases such as pass under the observation of the individual surgeon. Somewhat aside from this is the information now becoming available from the medical and statistical departments of the life insurance companies. While this material is highly specialized, and the facts, therefore, are not generally applicable to the population at large, yet certain special phases, such as the influence of alcohol on longevity have been studied, and the enlightened actuary of one large company is preparing a valuable analysis of the cancer situation.

While there is little reason at the present time to believe that heredity plays an important part in the occurrence of cancer, yet certain experiments in breeding mice have suggested that in these animals, at least, and in certain strains only, cancer may be subject to the laws of heredity. That these observations apply to man is doubtful, and the question can be settled only by very extensive studies which are of much more final value than breeding experiments. Such information as may be obtained of fair accuracy might be made a part of the death certificate.

While the fatal nature of cancer and its frequent occurrence are quite sufficient to keep alive a very potent interest in the cancer question, apart from any consideration of whether it is increasing or decreasing, such possible variation should be studied; first, because of its casting some light on the etiology of the disease; and, second, because of its practical importance as necessitating (if there be an increase) more frequent operative removal or medical treatment of such moles, senile keratoses or chronic ulcers as are apt to turn into cancer. Unfortunately it is impossible at the present time to make a definite statement as to any increase. So many conflicting factors are present that the statistical data do not as yet furnish a final decision. Equally able men hold that there is a demonstrable increase, and that there is none. In this situation the only remedy is the improvement of our mortality records, and however carefully these may be collected, they will never be of final value unless, first, autopsies are performed upon all those dying of disease, whether supposed to be cancerous or not, and, second, microscopic examination is made of the suspected tissues. If this could be done, and the varieties of the tumor also determined, many of the questions now insoluble would be answered in a couple of decades. For, besides knowing whether cancer on the whole is increasing, we must also learn whether one variety or another is becoming more frequent, or whether the organ frequency is changing. Bashford's investigation of the London Hospital records showed that autopsies and microscopic examination increased the number of diagnosticated cancer some 30 per cent.

These microscopic methods are too complex and too time-consuming for the practitioner to apply them, even if he had sufficient knowledge to make a diagnosis when the sections were prepared; which he has not. The state, therefore, should offer these facilities, and when they are offered, should require the submission of suitable specimens from all cases considered cancerous.

The discussion of the second phase of public health activities need not occupy very much of our time.

There is no question that the public, and even physicians whose medical degrees date back more than twenty years, are in many cases woefully ignorant of the fact that when a cancer can be diagnosed clinically with any ease it is already approaching an inoperable condition. There is still in the rural districts too much treatment of cancer with pastes and plasters, and

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other palliative methods, and even in the large cities it is only too frequent. It is only within the past twenty years that the fact that in its early stages cancer is a local condition and may be removed with a likelihood of a permanent cure, has become generally known to the profession, and it is still unknown to a large majority of the lay public. Plain talks, illustrated by lantern slides showing the appearance of cancers in the early stages, with demonstrations of pathological material, are of the greatest educational value to the layman and to the physician, and such campaigns of education should be repeated at frequent intervals in order that the lesson may not be forgotten.

The immediate and satisfactory results of such an educational campaign have been shown in Vermont, where, following the talks, clinics, and demonstrations recently given, large numbers of patients have applied for treatment at the different hospitals. These have been sent in by physicians who had previously referred but few cases of the disease, or have come from localities which had not before furnished such material.

Since cancers which can be easily diagnosed clinically, are almost always inoperable, it is extremely important, as has been previously stated, that facilities be afforded to physicians to obtain microscopical diagnoses either without charge or at very small cost. Every state should regard as part of its public health interests the provision of one or more laboratories where specimens could be sent, and examined and reported on within a few days by competent experts. This is already being done in many states in the case of diphtheria and typhoid fever, and the service should be promptly extended to malignant disease. Only in this way can there be prevented extensive and mutilating operations on persons who prove not to be suffering from cancer, and also only in this way can cancer be diagnosed in its early stages. Very wisely the state of New York has been among the first to offer these facilities under such excellent conditions as to staff and equipment as will guarantee prompt and accurate reports.

In this way the state can be of great aid in increasing our knowledge of cancer and in aiding the patient by supplying to the physician such opportunities for diagnosis as he cannot himself provide.

In conclusion, there is one other function which the state boards of health might well assume provided the necessary legislation could be obtained; that is, the regulation of the administration and sale of quack medicines especially those offered for the cure of cancer. There is no more pitiful spectacle nor one which more frequently confronts the physician than that of the patient suffering from an inoperable cancer, who has been reduced to absolute penury by the extortions of the unprincipled vendors of so-called cancer cures. Publicity has killed many of these cures merely by showing that they contain no substance which could be of the slightest therapeutic value; but this does not touch those which, being administered by their proprietors, are exempt from pur-

chase in the open market, and, hence, cannot be exposed by chemical analysis. If the state boards could obtain the right under the law to demand samples of these supposed remedies, the determination of their value would be a question of only a few months. Some animal tumors undergo spontaneous disappearance in a certain proportion of cases, being much less malignant than the corresponding variety in man, and these tumors form a most convenient indicator for the therapeutic capacity of any drug. If the quack remedy will not influence one of these growths, it certainly will not cure a human tumor which practically never undergoes spontaneous absorption. The expense of such an experiment is practically nothing. Suitable strains of animals can always be obtained from any of the large research laboratories and the propagation of the tumors is most easy.

Such a censorship is the proper function of state boards and would be of inestimable value in protecting a public whose gullibility makes one sometimes doubt the famous statement of Abraham Lincoln concerning the impossibility of fooling all the people all the time.

PUBLIC HEALTH REPORT OF THE SECRETARY OF THE TREASURY.

The annual report of the Secretary of the Treasury as it relates to the Public Health Service contains numerous recommendations bearing on the functions of that organization and evidences the great interest of this department in the extension and expansion of the governmental agencies for the protection of the public health.

In the development of general public health work, according to the Secretary, there is great need of additional medical officers. The number of requests for advice and assistance in health problems received from states and municipalities during the past year has far exceeded that in any similar period in the history of the Service, but the limited number of officers available for the work has prevented in many instances compliance with these requests.

The field investigations, the Secretary states, have served as a stimulus to state and local health agencies, and every effort should therefore be made to encourage and turn to practical account the interest in health matters awakened in the general public. For this reason an increase in the appropriation for field work is requested.

An additional building for the Hygienic Laboratory is urgently needed. The work of this institution has been greatly extended, particularly as it relates to the examination of viruses, serums and analogous products, a vast market for which has been recently created abroad. The safeguarding of these therapeutic agents requires great accuracy and precision and overcrowding is a serious handicap. In order that the public health may be better protected, an annual appropriation of $25,000 is recommended to be expended in carrying out the provisions of the law relating to the examination of these products.

The United States is the only government of importance which does not provide for the care and isolation of lepers. The establishment of a national leprosarium where the numerous lepers, most of whom are native born Americans, may be properly segregated and treated, thereby eliminating a menace to the health of others, is urged.

THE BACTERIAL EXAMINATION OF SAUSAGES AND ITS SANITARY SIGNIFICANCE.

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DURING the last decade considerable attention has been directed to the question of pure food and its sanitary distribution not only by reason of government inspection, but also because of an increasing public demand for pure food. For many years German officials have recognized the possible danger to public health from improperly prepared or handled sausages. French and English sanitarians have also recognized the importance of this question and have conducted some experimental work to ascertain the extent of the danger; but in the United States there seems to have been little or no work reported on sausages.

The nature of sausages and the finely ground meats composing them have led to much speculation on the part of consumers as to the quality and kinds of meat that might be used. Sausages are popularly reputed to contain anything from good pork and beef down to horse, dog and cat meat, as well as bread, flour, and other starchy substances. The presence of partially decayed meat may be effectively covered up by high seasoning, salting and smoking as well as by preservatives. Probably the most common adulterant added to sausages is starch either in the form of old bread or corn starch. Ostertag* reports that in Germany it is customary to add 2 per cent. of starch to all "brühwurst" and even as high as 5–8 per cent. The manufacturers prefer not to consider this as an adulterant, but claim that it is added to bring the "combining power" of the sausage to a proper point so that less shrinkage will occur in cooking and more food value be retained. The custom of rapidly fattening hogs is said by Ostertag to produce a fat that cooks away more than does that in hogs more slowly fattened, and the small amount of starch added only restores the swelling capacity of the muscle albumin and is hence not considered an adulterant.

The use of uncooked and visceral sausages, which are especially likely to contain pathogenic bacteria, has made the sausage problem in Germany of more importance than it is elsewhere. Lungs, spleen, liver and brains are often used in German sausages in large amounts. It is well known that pathogenic organisms are particularly likely to occur in the spleen and liver, while the keeping quality of the sausages are at the same time reduced by their use.

Savage† classes the danger from sausage poisoning under three heads:

1. From toxins produced by the ordinary bacteria of decomposition. This poisoning is generally not severe.

2. From infection with members of

* Ostertag, Robert. Handbook of Meat Inspection, 1904.

† Savage, W. G. *Med. Press and Circ.*, London, 1908, n.s. 86, p. 167.

the enteritidis group. This he considers a real source of danger to public health that is not completely obviated by either cooking or salting. In an experiment with sausages containing B. enteritidis, even a fairly well cooked sample contained the living bacteria in its interior. A 10 per cent. salt solution was found to kill the pathogens very slowly and six days were required to render the sausage sterile by this means.

3. Poisoning due to the toxins of B. botulinus. Outside of Germany, where it is present in visceral sausages, B. botulinus is rarely found, and even there it is much less common than formerly.

The number of bacteria in ordinary sausage varies greatly and very little significance can be attached to mere numbers. In well cooked, smoked sausages v. d. Slooten[1] found the number of bacteria very low and in one plating the sausage was sterile. He found that the diminution in the number of bacteria was greatly influenced by the drying and smoking process. One raw sausage sample became sterile after a week's smoking. In highly seasoned sausages many kinds of bacteria are unable to survive. The cocci are more resistant to salt and are consequently found in relatively larger numbers in highly seasoned meats. Even if very large numbers of bacteria are present, the greater part may not be unwholesome. No definite standard of bacterial content has been accepted which must not be exceeded if a sausage is to be considered wholesome. Savage believes that little importance can be attached to the number of bacteria present but considers the presence of intestinal bacteria of great significance. v. d. Slooten, nevertheless, sets the limit at 2,000,000 per gram and considers all containing over that number unfit for use unless an examination shows them to be harmless. Weinzirl and Newton[2] from their work on hamburger steak have suggested that 10,000,000 bacteria per gram be taken as a standard for a sanitary meat. They found, however, that this standard did not correspond in all cases with the "organoleptic" test.

The presence of B. paratyphosus and B. enteritidis in sausages has been reported from time to time by various observers. Rommeler[3] has recorded the work of Hübener who examined 100 samples of sausages and found B. paratyphosus six times. Mühlens, Dahm, and Fürst[4] fed 57 samples of all kinds of meat to 138 white mice and concluded that 24 of the samples contained B. paratyphosus and 13 contained B. enteritidis. Discredit has been thrown on the value of this work by more recent investigation showing that auto-infection may occur in mice with members of the enteritidis group especially where the normal nutrition of the animal is disturbed. In his own researches on visceral sausages Rommeler found B. paratyphosus in 8 out of 50 samples. Komma[5] examined 102 samples of sau-

[1] v. d. Slooten. *Inaug. Diss.*, Bern., 1907. (Cited by E. Roth in *Cent. f. Bakt.*, 1 Abt. Ref. 43, p. 403.)
[2] Weinzirl and Newton. Am. Jour. Pub. Health, 1914, 4, p. 413.
[3] Rommeler. *Cent. f. Bakt.*, 1 Abt. Orig., 1909, 50, p. 501.
[4] Mühlens, Dahm and Fürst. *Cent. f. Bakt.*, 1 Abt. Orig., 1908-09, 48, p. 1.
[5] Komma, Franz. *Cent. f. Bakt.*, 1 Abt. Orig., 1910, 55, p. 1–14.

sage and found 30 of them to contain B. paratyphosus. He believes that their presence is due to uncleanliness in manufacture as these organisms are found normally in the intestinal tract of the animals employed. Hübener[1] believes that meat poisoning from B. paratyphosus from healthy animals is questionable. In 65 cases of meat poisoning with positive bacterial findings he reports 36 due to B. paratyphosus and 29 to B. enteritidis. The toxin given off was so great that in some cases 2 cc. of bouillion in which they were grown, when injected into a mouse, caused death. Heinemann[2] reports an instance where two people were poisoned with B. paratyphosus from cooked sausage and one from raw meat obtained from the same butcher. Schmidt[3] found in healthy animals (hogs and horses) B. paratyphosus present that were not pathogenic. It should be mentioned, however, that the large number of cases in which members of the enteritidis group have been found by German investigators and called B. paratyphosus or B. enteritidis may be due to classification based on morphology and cultural characteristics alone. It is a well-known fact that many organisms thus classified cannot finally be identified as such by the agglutifiation test.

B. coli has been found almost constantly in sausages but little importance has been attached to its prevalence by most observers. Savage examined 12 samples of home ground sausages and found B. coli present in every case in numbers varying from 10–45,000 per gram. In 92 per cent. there were more than 100 per gram. He believes that they multiply rapidly in the sausages. In order to determine whether these bacteria were introduced in the skin used for a casing for the sausage, Savage examined twelve samples of casings, commercially prepared with salt brine, and found all to be free from B. coli. If B. coli survives this pickling process, he believes that the danger from pathogens surviving may be real. Maurel[4] has constantly observed the presence of a diplococcus in the sediment from apparently good sausages which produced a marked loss of weight in injected rabbits. By lowering the resistance through the introduction of small amounts of mercuric chloride, the loss after the injection of the diplococcus became much more marked. The organism could be found abundantly in the blood of the rabbits after forty-eight hours. The loss of resistance brought about by the mercuric chloride is ascribed by Maurel to a partial destruction of the phagocytic power of the leucocytes. He draws the inference that this diplococcus might be harmless to healthy individuals but under conditions of lowered resistance, from whatever cause, might become pathogenic.

The viability of organisms in sausages has been studied by different observers. Maurel[5] sterilized the surface of sausages, in bulk and slices of bologna, in an autoclav, tested for sterility and then infected them with colon and typhoid bacilli. Both organisms seemed to increase and main-

[1] Hübener, E. Jena (Gustav Fisher), 1910.
[2] Heinemann. *Zeitschr. f. Med. Beamte*, 1911, Beil. No. 1, p. 1.
[3] Schmidt, P. *Münch med Wochenschr.* 1911, p. 563.
[4] Maurel, E. *C. r. Soc. de Biol.*, 1911, 70, p. 617.
[5] Maurel, E. *C. r. Soc. de Biol.*, 1910 69, pp. 513, 574.

tain their activity for at least 24 hours and often for many days when placed in Petri dishes and kept at 35°C. B. typhosus, he found, died off slightly sooner than B. coli.

Very few detailed accounts of the methods used for the bacterial examination of sausages are to be found in the literature. Rommeler and Komma used essentially the same methods. The instruments and surface of the sausage were sterilized in hot oil, the sausage carefully opened and a cube-shaped portion taken from the inner part of the sausage and placed in a deep Petri dish. Sterile salt solution was poured over in which the meat was thoroughly emulsified. A knife point of papain, previously sterilized in a dry oven in a Petri dish at 130° C., was added and the emulsion incubated for two days at 37°C. By this time the sausage was digested and a drop of the liquid of a proper dilution was spread over a brilliant-green-picric-acid plate and also over a Conradi-Drigalski plate. The developing colonies that resembled the intestinal bacteria were then transferred and identified in the various media and by the agglutination test. Savage sterilized the outside of the sausage by cauterization, opened it sterilly and took about two grams, weighed accurately, into a bottle with a rubber stopper containing 20 cc. of sterile water. After thorough mixing, various quantities of the emulsion were added to lactose-bile-salt media and the resulting colonies transferred and identified in the various media. Weinzirl and Newton ground samples of meat (hamburger steak) with sterile sand in a mortar and obtained an emulsion in salt solution from which the necessary dilution were made. One cc. of the dilutions was plated on 1.5 per cent. agar with a reaction of 1.5 per cent. acid and incubated at 20°C. They made no effort to isolate intestinal bacteria. v. d. Slooten believes that animal experimentation is of great value in determining the wholesomeness of sausages. He used a water extract of the sausage and injected subcutaneously into mice, guinea pigs and rabbits. With good sausage no effect should be noticed on the animal.

The purpose of the work described in this paper is:

1. To determine the number of bacteria present per gram of meat and to find the factors influencing it.

2. To determine the prevalence of fecal or pathogenic organisms in the sausage.

3. To determine the presence of adulterants.

4. To determine the prevalence of the use of preservatives.

5. To find the influence of sanitary marketing on the bacterial content.

6. To determine the effect of cooking on the bacterial flora.

General Technique.—The thirty-four samples of pork sausage examined have been obtained under the usual conditions found in the meat markets of Chicago and have been brought directly to the laboratory for examination. Each shop has been scored on the basis of 100 per cent. on the sanitary surroundings, method of handling, exposure of meat, light and ventilation, cleanliness of workers and refrigeration at the time the sample

was taken. At the laboratory the utensils and the outside of the sausage were sterilized, the sausage being rotated in the gas flame for about fifteen seconds. The sausage was then carefully cut open with a sterile knife and three or four grams of the meat taken from the interior and accurately weighed. This was then emulsified thoroughly in an Erlenmeyer flask by means of a sterile glass rod with 100 cc. of sterile water. From this emulsion dilutions were made to 1–1,000,000. For the total count twenty-four hours' incubation at 37°C. and forty-eight hours' incubation at 20°C. on 1 per cent. glycerin agar neutral to phenolphthalein was used. For distinguishing roughly the intestinal bacteria, Endo medium +.5 was employed. Besides plating on these media, 1 cc. of each dilution has been added to a 1 per cent. dextrose broth fermentation tube to determine the number of gas-forming organisms. One cc. of the first two dilutions was added to each of three tubes of Torrey's medium* +.2 to +.5, containing respectively .15, .2, and .25 cc. of a 1 per cent. brilliant green solution in water. Forty-eight hours after plating, the colonies that on Endo looked like B. coli, B. paratyphosus, B. typhosus, B. fecalis, Proteus or Streptococcus were transferred to Russell's medium, and, in case of characteristic growth, each variety was studied morphologically in hanging drops and stains and transferred to litmus milk, gelatin, and 1 per cent. dextrose, lactose, and saccharose broths for further observation and final identification. Agglutination tests with paratyphoid and enteritidis serum were employed on seven of the nine organisms which apparently belonged to the enteritidis group. After twenty-four hours' incubation at 37°C., Endo medium plates were made from each of the brilliant green tubes and any developing colonies treated as from the original plating on Endo. At the end of forty-eight hours the fermentation tubes were examined and any sediment leading to suspicion was examined in stained preparations for streptococcus. In instances where B. coli failed to develop on Endo from the original plating, any dextrose tubes containing gas were plated and an effort made to isolate B. coli. By these methods B. coli was isolated from thirty of the thirty-four samples examined. Samples 13, 25, 29 and 31 showed no B. coli by any of these means. Sixty-six per cent. of the samples contained over 100 B. coli per gram of meat. In one instance, Sample 7, which was home-ground and not put up in link form, there were 38,000 B. coli present per gram. The total bacterial count both at 37°C. and 20°C. varied widely, the former from 2,500 per gram in Sample 33 to 1,538,000 per gram in Sample 9, the average being 158,000; the latter from 650 per gram in Sample 10, which was taken directly from the farm as soon as made, to 200,000,000 per gram in Sample 1, the average for all samples being 9,018,000. Little value can be attached to these averages in so wide a variation and with so few samples examined. In Table 1 a tabulation of the count from each sample is re-

* Torrey J. C. *Jour. Inf. Dis.* 1913, 13, pp. 263–272.

TABLE 1.

Sample number.	Score of shop.	Method of marketing.	Bacteria per gram meat at 37°C. 24 hours.	Bacteria per gram meat at 20°C. 48 hours.	B. coli present per gram.	Gas formers with dextrose per gram.	Corn starch per cent.	Sulfites.	Kinds of bacteria isolated.
1	86	Small link, bulk	910,000	200,000,000	+*	+*	2	Not tested	B. coli
2	89	Small link, carton	807,000	8,000,000	+*	+*	0	"	B. coli
3	84	Home-made, bulk	4,600	2,300,000	300	250	0	"	B. coli, B. fecalis
4	79	Home-made, bulk	4,300	72,000	1,600	4,000	3	"	B. coli, M. tetragenus
5	87	Small link, carton	8,800	144,300	850	3,500	0	"	B. coli, B. fecalis, Prot. vulgaris
6	86	Small link, carton	369,000	2,181,000	15,000	37,000	2	"	B. coli, Streptothrix, B. intestinalis
7	81	Home-made, bulk	131,600	6,269,000	38,000	31,000	3	"	B. coli, B. paracoli
8	88	Small link, bulk	58,800	16,755,000	3,600	4,000	6	"	B. coli, Prot. vulgaris, B. fecalis
9	86	Small link, carton	1,538,400	282,800	950	4,000	0	"	B. coli, B. fecalis, yeast
10	Farm	Direct from farm, bulk	47,000	650	200	350	0	"	B. coli
11	89	Home-made, bulk	27,000	6,758,000	7,400	31,000	0	"	B. coli
12	82	Small link, carton	271,500	271,500	1,500	300	0	"	B. coli, Prot. vulgaris
13	82	Small link, carton	35,900	1,900,000	0	0	0	"	B. coli anærogenes, B. fecalis
14	81	Small link, bulk	3,700	1,962,000	31	310	6	"	B. coli, Streptococcus
15	82	Small link, bulk	119,000	562,000	2,500	41,320	0	"	B. coli, B. paracoli, Prot. vulgaris
16	87	Small link, bulk	19,700	7,561,000	900	4,000	5	"	B. coli, Streptococcus, yeast
17	85	Small link, bulk	6,300	2,200,000	350	5,000	3	"	B. coli, B. paracoli,† yeast
18	89	Small link, home-made	2,600	641,400	34	340	0	"	B. coli, Prot. vulgaris, B. fecalis

TABLE 1—(*Continued*).

Sample number.	Score of shop.	Method of marketing.	Bacteria per gram meat at 37°C. 24 hours.	Bacteria per gram meat at 20°C. 24 hours.	B. coli present per gram.	Gas formers with dextrose per gram.	Corn starch per cent.	Sulfites.	Kinds of bacteria isolated.
19	83	Small link, bulk	646,700	36,800	382	2,500	0	Not tested	B. coli, Prot. vulgaris fluorescens, yeast
20	83	Home-made, carton	16,100	2,200	28	280	0	"	B. coli, Prot. vulgaris
21	86	Small link, bulk	30,000	20,482,000	180	30,000	5	"	B. coli, B. paracoli,† B. fecalis, yeast
22	74	Large link, bulk	12,500	5,600	1,000	24,000	5	+	B. coli, Prot. vulgaris
23	71	Small link, bulk	20,000	56,700	700	3,500	12	+	B. coli, Prot. vulgaris
24	59	Large link, bulk	39,600	773,600	57	286,000	0	0	B. coli, Staph. aureus, B. paracoli.†
25	77	Large link, bulk	4,000	36,900	0	3,000	8	+	B. coli
26	60	Small link, bulk	10,400	4,467,500	155	2,600	4	0	B. coli, Prot. vulgaris
27	55	Large link, bulk	33,000	1,568,000	10,000	20,000	8	+	B. coli
28	71	Home-made, bulk	24,400	3,397,000	24	240	0	+	B. coli, Prot. vulgaris B. paracoli† Staph. aureus
29	64	Large link, bulk	5,340	3,353,000	0	340	5	0	Prot. vulgaris, B. paracoli†
30	74	Large link, bulk	75,000	2,211,000	182	2,000	4	+	B. coli, Streptococcus, yeast
31	80	Small link, bulk	10,800	100,000	0	2,600	10	+	Streptococcus, B. fecalis, yeast
32	89	Small link, carton	33,100	2,108,000	117	23,400	?	0	B. coli
33	75	Small link, bulk	2,500	7,873,000	83	8,300	6	+	B. coli, Streptococcus, B. paracoli†
34	75	Large link, bulk	3,700	1,823,000	92	1,840	4	0	B. coli, Staph. albus, B. paracoli†

Samples 1–21 from markets in good residence district; 22–34 from poorer markets.

*Exact record not taken.

† Agglutination negative with paratyphoid and enteritidis serum.

corded. Samples 1–21 were all taken from shops in a good residence district of Chicago, near the University of Chicago, that are above the average from a sanitary viewpoint, while Samples 22–34 were taken from poorer, less sanitary districts on the west side of the city. These shops were in most cases highly unsanitary, yet the counts on samples from these unsanitary shops showed no increase over those on samples from shops scoring higher. In fact the average count of the samples from the more sanitary shops at 37°C. was 241,000 per gram against 24,000 per gram from the west side shops. The 20°C. count showed an average of 13,280,000 against 2,133,000 from the respective regions. This may indicate that the sulfite found in many of the west side samples was an important factor, either in the prevention of the bacterial multiplication or in the destruction of the bacteria originally present, resulting in the lower count. In the west side samples free from sulfites, however, there seemed to be no constantly greater number of bacteria present than there were in the samples containing sulfites.

Influence of Casings.—An effort was made to determine the influence of the sausage casings on the bacterial count. For this purpose the scrapings from the interior of the casings from seven samples, 13–19, were run parallel with the interior contents of the same sausage. The sausages were split open with a sterile knife, the contents taken out and the inside of the skin scraped. The seven samples run in this manner showed the following results:

1. In five of the seven samples the 37° count of the scrapings at twenty-four hours was greater than that of the interior content.

2. In four of the seven samples the 20° count of the scrapings was greater.

3. In five of the seven samples the 37° count of B. coli was greater in the scrapings.

4. In one sample no B. coli was found in the scrapings while there were a few in the interior of the sausage.

5. In one sample an intestinal organism related to the enteritidis group was found in the scrapings but not in the interior of the sausage while in one sample it was present in both.

6. Proteus vulgaris was present in three of the seven samples of scrapings.

Samples 9, 10, 11, and 12 were treated according to the methods of Rommeler and Komma for the isolation of B. paratyphosus, in addition to the routine method. It was found that after digestion for forty-eight hours one drop of the solution produced such an overgrowth that dilution was necessary to distinguish individual colonies. As there seemed to be no advantage by this method over that of Endo while it was more difficult to employ, it was discontinued.

Brilliant Green.—Brilliant green has been used in routine according to the methods described by Torrey for the isolation of members of the enteritidis group. The reaction of the media has been varied from +.2 to +.5 and the amount of the brilliant green from .15 to .25 cc. of 1 per cent. aquous solution added to 10 cc. of broth. In two of the nine cases where enteritidis group

organisms have been isolated, they have been isolated by this means. The reaction and amounts of green added within the limits employed produced little difference. Seven times enteritidis group organisms were obtained from Endo but failed to develop in the brilliant green while B. fecalis, B. coli and Proteus survived at the end of twenty-four hours in four, three and two cases respectively. In Sample five all other varieties of organisms were killed but a member of the streptothrix group. In about 60 per cent. of the samples the brilliant green tubes were sterile at the end of twenty-four hours.

The following organisms have been isolated by the methods described above from the thirty-four samples: B. coli, thirty times; Proteus vulgaris, eleven times; B. paracoli (organism resembling B. paratyphosus morphologically and culturally but not agglutinated by either paratyphoid or enteritidis serum), nine times; B. fecalis, eight times; yeast, eight times; streptococcus, five times; Staph. aureus, two times; and M. tetragenous, a streptothrix, B. intestinalis, B. coli anærogenes, Proteus fluorescens and Staph. albus, once each. The presence of intestinal organisms in so many cases is possibly indicative of unsanitary and careless methods of manufacture but a more extended study would be necessary to determine the significance of these forms. Proteus vulgaris, which was present in one third of the samples, might indicate that old meats in which decomposition had begun were used but in the absence of control tests on known fresh meats for the presence of this organism, should not be given too much importance.

Sulfites.—Samples 22–34 were tested for the presence of sulfites. Five to ten grams of the meat to be tested were placed in an Erlenmeyer flask of 150 cc. capacity, two or three grams of finely granulated C. P. zinc added and then about 30 cc. of strong C. P. HCl poured over the mixture. Controls were always run parallel with the samples and a distinct silvery-black mirror on a filter paper soaked in lead acetate and held over the mouth of the flask five minutes, was considered a positive reaction for the presence of sulfites. A faint gray-black discolorization will generally be obtained from sausages free from sulfites at the end of five minutes but there is never seen the intense black mirror shown by samples to which the preservative has been added. By this means seven of the thirteen samples were shown to contain sulfites, five contained none and one was doubtful. Although sulfite tests were not carried out on Samples 1–21, fifteen samples obtained from the same shops subsequently were examined. Of these samples, three only contained sulfites. Samples 29 and 34, manufactured by the same packing house but obtained from different shops, contained no sulfites, while Samples 30 and 33 manufactured by a different firm, both contained a large amount of sulfites. The samples containing this preservative appeared to have no fewer bacteria per gram than those without the preservative, although the meat might have been originally of poorer quality and the

bacterial count held low by the presence of sulfites.

Starch Adulteration.—Each of the thirty-four samples was examined microscopically for starch adulteration. In samples containing more than 5 per cent., the starch could readily be detected by the eye and taste and gave the sausage a granular appearance. The sausage was rubbed over a microscopic slide and examined fresh to determine if possible the kind of starch granules present. Then Lugol's solution was added and allowed to remain on the slide for a minute and the preparation examined for the presence of the blue-stained starch granules. From the macroscopic and microscopic examination a rough estimate was made of the per cent. of starch added. It must be borne in mind that the pepper used for seasoning contains normally 35–45 per cent. of starch and dextrin and may give a somewhat similar appearance to other starch in stained preparation. It may also happen that the pepper itself may be adulterated with buckwheat middlings or other starchy substances. Cornstarch was very commonly used in a very finely ground condition. It was present in 19 of the 34 samples or in 56 per cent. of all. In 26 per cent. of the samples, 5 per cent. or over was used. It was interesting to note that starch was present in 77 per cent. of the thirteen samples from the poorer districts and in only 38 per cent. of the samples from the more sanitary shops, and that the price per pound in these districts was 13–15 cents and 18–25 cents respectively. In other words the customers of the west side shops are buying starch while the customers of the shops in the better residence districts are buying meat. In the samples that contained starch from the latter district, the per cent. was generally much lower than in samples of the west side as may be seen by reference to Table 1.

Influence of Cooking.—Six samples of pork sausage have been obtained and cooked in various ways in the laboratory to determine the effect of cooking on the bacterial count. It has been the purpose to cook the sausages as nearly as possible as they are cooked in the home. The methods and thoroughness of cooking varies greatly in different homes. This fact has made it desirable to vary the time and method of cooking. A sample of the uncooked sausage was always run in parallel in order to determine the efficiency of the cooking. The sample from the cooked sausage was always taken from the interior after splitting the sausage open under aseptic conditions. Small pork sausages in link form were employed in all cases. It was found in general that cooking destroyed a very large per cent. of the bacteria; and that extra well-cooked sausage in two of the samples were sterile. The detailed results with the conditions of cooking are shown in Table 2. The efficiency of cooking will be seen to vary only within the narrow limits of 93.3 per cent. in Sample 3 to 100 per cent. in Sample 2.

Four samples of sausage cooked in restaurants were obtained and brought directly to the laboratory to be examined as a control on the efficiency of ordinary restaurant cooking. The methods of examination were the same

TABLE 2.

Sample No.	How prepared.	Bacteria per gram 24 hours at 37°C.	Bacteria per gram 48 hours at 20°C.
1	(a) Uncooked	10,500	813,000
	(b) Let simmer in water 10 min. Fried in lard (cold at start) 15 minutes	500	0
	(c) Let simmer in water 10 min. Fried in lard (cold at start) 20 minutes	300	0
2	(a) Uncooked	47,500	929,000
	(b) Let simmer in water 10 min. Fried in lard (cold at start) 10 minutes	0	0
	(c) Let simmer in water 10 min. Fried in lard (cold at start) 15 minutes	0	0
3	(a) Uncooked	33,000	5,700,000
	(b) Boiled in water 20 minutes	31	190
	(c) Boiled in water 30 minutes	0	105
4	(a) Uncooked	55,000,000	80,000,000
	(b) Boiled in water 15 minutes	3,300	200
	(c) Boiled in water 20 minutes	130	0
5	(a) Uncooked	110,000	47,700,000
	(b) Fried in hot lard over asbestos 10 minutes	7,300	100
	(c) Fried in hot lard over asbestos 15 minutes	60	60
6	(a) Uncooked	950,000	132,000,000
	(b) Fried in hot lard over wire gauze 8 minutes	70	200
	(c) Fried in hot lard over wire gauze 12 minutes	0	0

as described above. A small amount of the interior contents being carefully taken and emulsified in sterile water for plating. The results as will be seen vary widely, from an absolutely sterile sample, 3, to one containing 8,000 bacteria per gram. The detailed results are seen in Table 3.

The necessity for the proper sanitary handling of sausage in its manufacture and distribution is self-evident. It is probable that intestinal bacteria

TABLE 3.

Sample No.	Bacteria per gram on 1.5 per cent. glycerin agar (neutral).	
	37°C. for 24 hours.	20°C. for 48 hours.
1	55	205
2	61	0
3	0	0
4	1,075	8,000

enter during the manufacture and that the method of subsequent handling is responsible for the large number of bacteria that develop at 20° C. This fact is illustrated by one sample, No. 10, which was brought directly from the farm where it was ground under ordinary farm conditions. The 20° count was unusually low, 650 per gram.

From the work described in this paper the following conclusions may be drawn:

1. The number of bacteria per gram of sausage varies so widely that little importance can be attached to the bacterial count alone. Many factors, such as the precautions used in manufacture, proper handling in the shops, and the presence of preservatives may influence the count greatly.

2. Skins used as casings, if properly prepared, cannot be considered to increase the bacterial count or the danger from pathogens.

3. Brilliant green as an aid in the isolation of the enteritidis group has proved of limited value only.

4. B. coli is commonly present in sausages. Organisms biologically related to but not identical with the enteritidis group were present in 25 per cent. of the samples and Proteus vulgaris in 33 per cent. of them.

5. Sulfites were present in 54 per cent. of the west side samples and in 20 per cent. of the samples later obtained from the more sanitary shops.

6. Corn starch was found in many samples in amounts varying from 2–12 per cent. Fifty-six per cent. of all samples contained some starch.

7. Ordinary cooking is effective in destroying a large per cent. of the bacteria present.

I desire to express my appreciation to Professor Edwin O. Jordan for valuable suggestions in this work.

PROPOSED MEDICAL CONSOLIDATION IN NEW YORK.

A plan to merge the health department, the Department of Charities, and Bellevue and Allied Hospitals into a single Department of Social Service under one head recommends itself, according to the *Evening World* for November 5, as a businesslike, common sense step toward setting the municipal corporation on a new basis of economy and efficiency.

These three departments handle over $9,000,000 a year. Their work is so closely allied, particularly in the case of the health and charities departments, that one bureau is constantly duplicating the inquiries and remedial measures of another. If they were consolidated their agents and investigators could work together on the same cases, administering relief with the least possible waste of time and money. Moreover, a single head could purchase at a considerable saving the millions of dollars' worth of supplies which these departments now buy separately.

To taxpayers the proposal is welcome, not only for the specific saving it contemplates but also because it should lead to a general scrutiny of city departments with an eye to consolidation, concentration, and increased efficiency. The suggestion has been made that combining the Department of Bridges with the Department of Docks would save the city half a million each year; also that municipal expenses could be reduced at least $250,000 by abolishing the commissioner of accounts, much of whose work could be as well or better done in the comptroller's office.

It is thus that the executive heads of any private corporation set to work to get results. The city hopes it at last sees the beginning of just such a program.—*New York Medical Journal.*

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THE DISPENSARY AND THE DISEASES OF SYPHILIS AND GONORRHŒA.

Dr. Richard Cabot once illustrated the situation of the tuberculosis patient after being told of his disease and the required treatment of sunshine, fresh air, rest, etc., by reference to the incident in "Alice in Wonderland" in which the King, after inviting Alice to have some cake, replies to her remark that she doesn't see any, that there isn't any. Great strides in supplying the cake for the tuberculous individual have since been made, but the victim of syphilis or gonorrhœa stands today where the former stood ten years ago. An increasing number of health departments are providing laboratory assistance in the diagnosis of venereal diseases, available to private physicians and both public and private institution directors. Following this, certain of the best organized and progressive municipal or state departments have established advisory consultation hours for venereal diseases, either separately or as a part of the general service for infectious diseases. But having diagnosed the case and advised concerning the disease, the questions, "Where shall I go for treatment?" "How can I carry out these instructions?" are usually met by an admission that nothing further can be done. At this point, the dispensary is coming to the rescue through the reorganization of free clinics, the establishment of evening pay clinics, and the extension of social service to the venereal diseases. A sufficient number of institutions have thus organized such services under genito-urinary and gynecological or other divisions to prove their practicability and usefulness. Already this second step has led to the demand for a third, *i. e.*, the provision by hospitals of adequate facilities for observation and treatment of cases with which the dispensary cannot effectively deal alone.

That there is need for a survey of all these facilities for the diagnosis and treatment of venereal diseases in each of our cities is indicated by the accumulat-

ing evidence being gathered in New York City.* One study of twenty-seven clinics offering treatment for syphilis shows that only seven meet the requirements of the Associated Out-Patient Clinics and only four of twenty-six clinics offering treatment for other venereal diseases meet these standards. The records of only two of these clinics could be profitably analyzed, the results of the analysis showing less than 10 per cent. of the patients dismissed as cured. A study of thirty general hospitals shows that only ten receive recognized cases of syphilis in actively infectious stages, but that care and treatment will be given in twenty-seven if the patient has been admitted upon the basis of some other diagnosis, and nine will receive adult cases of gonorrhœal infection clearly requiring hospital treatment. Thirteen will not receive known complications of syphilis or gonorrhœa. No standard of administration similar to the requirements of the Associated Out-Patient Clinics exists for hospitals. Only seventeen of the thirty cited make any attempt at providing the services of a syphilologist. The regulations of five of these hospitals require three tests before discharging a syphilitic—(a) healed lesions, (b) entire disappearance of symptoms, (c) at least one negative Wassermann. One hospital requires two tests before discharge of a gonorrhœic patient—(a) negative complement fixation, (b) negative prostatic massage (for men) or negative cervical smear (for women). The remaining hospitals either have no regulations or refer discharged cases to the social service department for inadequate follow-up work.

The list of health departments, dispensaries, hospitals, and other agencies beginning excellent work in attacking the administrative problem of venereal disease control is already too long for enumeration, but when it is realized that careful investigations covering a constantly increasing number of individuals, representing every class of citizen and all types of occupations, show evidence of syphilis in from 8 per cent. to 25 per cent. of those examined, and in certain groups (exclusive of prostitutes) 40 per cent., relatively higher percentages being found for gonorrhœa, the need for rapidly extending the work begun by the pioneers is obvious. Health officers particularly should make every effort to stimulate interest in this difficult problem of preventive medicine which seems at last to have reached the stage for administrative action.

WHY A SOCIOLOGICAL SECTION?

A number of American Public Health Association members at recent annual meetings have expressed a doubt as to the exact purpose and function of the Sociological Section. This attitude has been more or less shared by the officers and members of the section itself. Consequently, considerable thought has been devoted to the subject, for the purpose of ascertaining whether there were or were not sufficient grounds to justify the continuation of the section as a separate division of the Association. It is felt by the present officers that the section has a definite function to perform, of immediate significance, though one, perhaps, which quite possibly may be by no means permanent. Immediately, however, it would seem that the Sociological Section can and should serve the rest of the Association in the following ways:

1. The working out, in coöperation with the Statistical Section, of standards and definitions for the collection, analysis and presentation of data in the social and health investigative fields.

* Various studies conducted through the coöperation of the Association for the Improvement of the Condition of the Poor, the Academy of Medicine, the Associated Out-Patient Clinics, the Society of Sanitary and Moral Prophylaxis. Most of the data has been published for distribution by the American Social Hygiene Association, 105 West 40th Street, New York City.

2. The incorporation in the program of the American Public Health Association of:

(a) Health problems for which there seems to be at the present time no logical place elsewhere in the Association.

(b) Health problems that might be and perhaps have been treated in other sections of the Association but which can best be presented in the Sociological Section because of the urgent necessity for particular emphasis upon the social and economic aspects of the problem, as for instance, the 1915 venereal disease symposium.

(c) Health problems which have not until recently been looked upon as of special public health significance, but which, from the point of view of prevention and social economics, need introduction to the Association as a whole, such as the Mental Hygiene symposium in the program for this year.

(d) Health problems now considered by other national organizations which may eventually become affiliated with the American Public Health Association and the program of which, through the contact point of the Sociological Section, may thus be presented to the members of our Association.

It would seem that until there is a more clean-cut demarcation of the public health field and until the process of amalgamation of private health association activities has been brought about, the Sociological Section can serve a useful purpose through the channels of exploration, introduction and specific emphasis, as outlined above. The members are invited to comment upon these conclusions and to communicate with the Association's Secretary, if moved to the expression of an opinion. They are invited to study, and if possible, take part in the program of the Sociological Section of the Cincinnati meeting which has been organized with the object of illustrating as effectively as possible the several functions tentatively adopted as the "platform" of the Section.

DR. JOSEPH HENDLEY TOWNSEND.

Members of the American Public Health Association and health workers in general will regret to hear of the death of Dr. Joseph H. Townsend, Secretary of the Connecticut State Board of Health. Doctor Townsend succumbed to pneumonia on January 7.

The *New Haven Register* has printed the following fitting editorial in memory of Doctor Townsend and his service:

"An eminently useful life, of which New Haven is justly proud, is brought to its earthly close, prematurely, we think, in the passing of Doctor Townsend. In a community which has had many distinguished members of his profession he has been conspicuous for his skill, his learning, his untiring enthusiasm for the cause of healing and public health. To the private practitioner the community owes much in a personal and intimate way—and Doctor Townsend had done his share of that sort of service. But he had an ambition and a capacity for a broader contribution to the common good, and in that he has achieved a notable eminence. His work for public health, in the community and in the state, will stand as the most abiding monument of Doctor Townsend's career, but as teacher, lecturer and writer he was still more widely known and will be long remembered.

"Many are the circles with which Doctor Townsend had been associated in his public career of thirty years, and in all of them he will be missed and mourned. He was a man of many parts, of broad sympathies and catholic friendships, and improved well his advantages for serving many men in many ways. All Connecticut has had the blessing of his life work, and all Connecticut pays tender and earnest tribute to a remarkable life."

WORKSHOP EDUCATION IN HYGIENE.

R. C. Routsong,
National Cash Register Company, Dayton, Ohio.

Read before the Industrial Hygiene Section of the American Public Health Association, Rochester, N. Y., September 7, 1915.

In this paper Mr. Routsong outlines a comprehensive program for workshop education and hygiene. Mr. Routsong's experience in this matter makes his statement extremely valuable to industrial hygiene workers.

WORKSHOP education in hygiene is still in the early stages of development. Industrial organization attempting to improve the shop man and shop conditions find comparatively few examples of success. What to do and how far to go are still unsettled questions, and up to the present trained men have been lacking to carry out constructive programs to a successful conclusion. It is encouraging, however, to find a growing faith in the possibility of and enthusiasm for the conservation of man. When the task has been more clearly defined and men have been trained for the work, this faith and enthusiasm will bring a better industrial order.

From the collective standpoint, the education of the millions of men and women in industry is a stupendous task. From the standpoint of the employer and employees of the average individual shop, the task is now unduly complex or formidable.

Let us assume that the values in good housing (or factory construction) and good housekeeping have been appreciated, and that the employer has tenanted his building with well people. He desires to teach them to be good housekeepers and good caretakers of their bodies.

To do this, five phases of industrial hygiene should have attention. These are fundamental and without them any attempt at workshop education will be only partially effective.

First, the suppression of infectious and contagious diseases. The employee should know that physical examination prior to employment, reëxaminations, and constant medical supervision are the best means of guarding him against communicable diseases.

Second, personal hygiene in relation to diseases known to be associated with processes common to the manufacture of the product. Information regarding the prevention of tuberculosis, constipation, nervousness, are good and valuable, but how much better when given as part of the solution of the health problems of the tradesman — the painter, polisher, founder, printer. An intelligent and sympathetic grasp of the health hazards of a trade is a vital factor in the reduction of its hazards.

Third, personal hygiene in relation

to diseases resulting in lost time and decreased efficiency. These diseases should be known and their remedies clearly stated. Both employer and employee are benefited by knowing what the causes of lost time are, as this forms a substantial basis for educational work the advisability of which is above question.

Fourth, there must be a proper appreciation of sanitary working conditions and first aid equipment. The employer who has exerted every effort to keep his lavatories and rest rooms clean is in the best position to solicit his employees' coöperation. Campaigns against spitting, untidiness, intemperance, will be more effective when the management has set the example. It should be the employer's privilege to explain what sanitary conditions and first aid equipment really are, and how and why they should be maintained.

Lastly, it is not going too far afield to discuss with the workman the problems of home hygiene. These discussions should include food, its kind, preparation, and how it should be protected by the housewife and through community regulation; home sanitation, including such matters as cellars, heat, ventilation and plumbing, sleeping arrangements, and the like. To neglect some of these things is to neglect one of the most important causes of physical inefficiency and breakdown, because the home life of the worker, together with his habits, do more to impair his efficiency than even the worst conditions in the average factory today. And, furthermore, the trend of legislation seems to be towards sickness insurance for which the indemnity shall be paid jointly by employer, employee and the state.

Whatever is attempted within the workshop, should be done only after careful analyses of the health problems of the plant have been made. We should then attack those problems known to involve keeping men from earning the living to which they are entitled, shortening their period of usefulness and leaving their machines which turn out the product idle or in untrained hands. To carry out any campaign of workshop education in hygiene the following are suggestions for directing it to a successful conclusion:

1. An organized department, call it welfare or what you will, the sole purpose of which will be to study the needs of the shop and meet them. If a department is not feasible, a good substitute is a committee employing a secretary, who shall be a factory inspector, giving his entire time to the work. The objection to a committee without a secretary devoting his entire time is that such important matters as the committee will have to deal with cannot be left to men who are interested primarily in production or selling. These men have not as a rule the time to devote to the details which in this movement are so important.

2. A plant physician or physicians and visiting nurses. It is important that the physician give his entire time to the plant. He can do his best work if the health of the employees is his sole consideration and he has no private practice to build up or maintain. The visiting nurse can do the practical

home educational work with members of the employee's family and by her offices can establish a personal relationship which is so essential to the success of the movement.

3. Industrial health records. These should locate and define the health problems of an industry so that the employer and employee may see them at a glance. We suggest that a survey be made of all departments for industrial health hazards, the results to be charted on a drawing of the plant. Polishers, grinders, platers, buffers, etc., should be included. The causes of time lost should be brought out clearly in departmental health and accident records. A tabulation of medical examinations of old and new employees and cases coming voluntarily to the emergency hospital will make the problem still more clear and definite. The work of the visiting nurse should not be overlooked. Providing she is tactful, sincere and efficient, a record of her work will be of much value to the employer who is interested in the welfare of his men and women, their homes and the community in which they live.

4. Bulletins are most important. These tell a story simply and quickly. They should never carry more than one idea.

5. Plant publications. Weave into them health hints and pertinent facts based upon conditions found in the factory and the community. Brief descriptions of communicable diseases may be included provided these descriptions are told in simply everyday language.

6. Let the weekly pay envelope contain a sentence or two of some simple fact of shop or personal hygiene.

7. Lectures. Illustrated lectures, either during working hours or after, are extremely good means of bringing home the elements of factory and personal hygiene. The lectures, to be successful, should be exceedingly simple; all technical terms being avoided, and, in so far as possible, every statement illustrated. The subjects covered may well be those which vitally affect health and efficiency; such subjects as the care of the teeth, cleanliness, foods (milk, meats, and others), exercise, diseases, home sanitation, can be given to advantage. Last year my company gave to all our employees, on company time, three illustrated lectures; air or respiration and circulation, food, covering digestion and some of the diseases of the digestive organs, and venereal diseases. These lectures were illustrated by slides and moving pictures. All through, the emphasis was put upon the delicacy of the human machine and the necessity of giving heed to the great laws of nature.

Whatever the particular line of education attempted, and each factory has its own problems, education must begin at the top. It is futile to expect the rank and file to listen, or to do, if the majority of those in authority are not themselves sympathetic with the work being done. The first step, therefore, is the educating and arousing the coöperation of all officers down to and including the job-foremen. When this is done, the endeavors will not be looked upon as mere fads or whims of some cranks "higher up." Then, too,

the work will assume the characteristic it must have for success, namely, the personal equation. One of the great needs of our large industries today is to make relationships more personal. I know of no means more promising of good results than a sane program of education in hygiene, worked out by a systematically organized department, disseminated by bulletins, publications, and lectures; and finally driven home by the personal interest of physicians, visiting nurses, job-foremen foremen, and all those in authority.

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TUBERCULOSIS CAMPAIGN SPENDS $22,500,000 IN 1915 AS AGAINST $5,000,000 IN 1905.

Figures indicating the growth of the anti-tuberculosis campaign in the United States show that in the year 1905 about $5,000,000 was spent in this movement while during the year 1915 over $22,500,000. These figures are part of the annual statistical statement of The National Association for the Study and Prevention of Tuberculosis published today. The statement is based in part on actual reports received from anti-tuberculosis agencies throughout the country and in part on estimates made by the Association.

In 1905 probably less than $100,000 was spent for anti-tuberculosis work other than the care of tuberculosis patients in a few poorly equipped sanatoria and hospitals. In 1915 over 1,400 anti-tuberculosis associations spent nearly $1,225,000 in organization and education. Special tuberculosis dispensaries, of which there are 450, spent over $1,150,000 in examining, advising and treating patients. Open air schools, of which there were none in 1905, spent more than $350,000 in teaching and treating anemic and tuberculosis children, while nearly $750,000 was spent in the care of tuberculous insane and prisoners. Sanatoria and hospitals for the care of consumptives, nearly 600 of them, spent $19,250,000. Much of this sum was contributed by private, pay-patients, but the greater part, over $12,000,000, was paid by federal, state, city and county boards for free treatment.

As an indication of the way in which the burden of the care of consumptives is being shifted to the public's shoulders, where it rightly belongs, the National Association points out that in 1905, as nearly as can be estimated, less than 25 per cent. of the total expenditure of $5,000,000 for tuberculosis was from public funds, while in 1915, nearly 65 per cent., or $14,500,000, was from this source.

New York State again leads the states with the largest total expenditure of nearly $5,000,000 with Pennsylvania second, and Illinois third. The following table shows the relative public and private expenditures in each of the five leading states:

EXPENDITURES IN 1915.

State.	*Public.*	*Private.*	*Total.*
New York...	$3,193,415	$1,751,096	$4,944,511
Pennsylvania	2,172,711	534,722	2,707,433
Illinois.....	1,558,644	902,314	2,460,958
Massachusetts	1,349,033	357,510	1,706,543
Colorado....	97,500	862,765	960,265

INVESTIGATION INTO THE RELATIONSHIP OF FLIES AND DIARRHEAL DISEASE IN CHILDREN UNDER ONE YEAR OF AGE IN NEW YORK CITY.

PHILIP S. PLATT, M. A.,
Superintendent Bureau of Public Health and Hygiene Department of Social Welfare, New York Association for Improving the Condition of the Poor.

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville, Fla., December 1, 1914.

SINCE the last meeting of this Association, the Bureau of Public Health and Hygiene of the New York Association for Improving the Condition of the Poor has reported in the AMERICAN JOURNAL OF PUBLIC HEALTH for March 1914 upon its first year's study of the relationship of flies to disease. In that report the continuation of the study along similar lines was promised. The present paper is a description of the investigation undertaken in the summer of 1914.

It is sixteen years since the prevalence of typhoid in the American military camps brought to a focus the danger of flies. Much significant activity against the fly has been seen here and abroad since that time. The abolition or screening of privies, the disinfection or removal of manure and other sources of breeding, the prevalence of anti-fly campaigns, are familiar activities on every side. Sanitation, clean-ups, fly campaigns have been rife, and, to be sure, the sickness and death-rates have fallen.

The problem is one in which loose reasoning and easy assumptions have been the rule rather than the exception. Little if any serious attempt has been made to measure the effect upon the fly problem of such important influences as the sanitary condition of the home, type of feeding and the like. The fly has often been given the credit of the combined influences of these several factors. Is the fly as important in clean homes as in dirty homes? What is the influence of flies and "dirt" combined? Are either equal in importance to artificial feeding? Such questions are fundamental to any study of the fly. Relative sanitary values are of the utmost importance.

As a potential mechanical transmitter of the majority of communicable diseases the fly has few equals. So ubiquitous and omnivorous an insect has unrivalled opportunity to accumulate and disseminate infectious matter. But just what share the fly has, under ordinary conditions, in conveying disease, we have only scant information. For every community this percentage of the total sickness transmitted by the fly would, of course, be different. It could not be the same in Jacksonville, in Nome, and in the crowded tenements of New York. So far most of our information on this subject has come from the South. For our northern cities like New York, sewered but densely crowded, we have little accurate knowledge.

If the health officers in the North are

to determine accurately what results can be accomplished with the resources at their disposal there is an ever greater need of carefully controlled measurements of such sanitary problems as the importance of the fly. Without a sense of proportion regarding sanitary values, an indictment against the fly, whether light or heavy, is of dubious significance.

It was with the intention of determining the influence of the fly under these carefully controlled northern conditions that the Bureau of Public Health and Hygiene jointly with the Bureau of Child Hygiene of the Health Department devoted the summer of 1914 to an intensive study in the homes of over a thousand infants. As previously reported, its experiment of the summer of 1913 showed that three times as much diarrhea occurred among those of all ages in a fly-exposed, unsanitated area as in a fly-protected, cleaned-up area. No attempt was made to isolate or measure separately the several influential factors and the results consequently were accredited to flies and other insanitary conditions combined, rather than to flies alone. Recognizing the preliminary nature of this study and the need of substantiation by more delicate methods and more careful control, the present three months' study was planned.

The Census.

Three districts, one predominately Italian, the second Jewish, the third Irish, were chosen chiefly on account of their high diarrheal mortalities, congestion and typical tenement house conditions. The two former may be described as flanking Manhattan bridge on the lower East Side, the latter on the West Side, as in the heart of Hell's Kitchen. Each district covered about eighteen square blocks.

In each district a canvass was made by trained nurses of 400 families containing an infant under one year of age. Detailed information about the family, the condition of the home, the care of the baby and the degree of coöperation promised by the mother in a fly campaign, was recorded in each instance. The 1,200 families were then divided at once. In one group the special fly-protective measures were to be enforced; in the other group the absence of such measures would enable it to serve as a "control." Great pains were taken to make the two groups entirely comparable. Many conditions were taken into consideration in this division; namely, the size of the family, the care of the infant, the promise of future coöperation, the possession of fly netting for the baby's protection, and the presence of sick or delicate children, of which there were 6 per cent.

Twelve nurses and three supervisors composed the force which visited each home every five days for three months. Such a force was beyond the means of the Bureau, and had not most generous coöperation been given by the Health Department in the form of six Department nurses, it would have been impossible to conduct the study on so large a scale. From many sources the Bureau has received most generous coöperation and advice. To all who have assisted, and especially to Dr. William H. Park,

Director of the Health Department Laboratories, the Bureau expresses its sincere appreciation.

Protective Measures.

Immediately the question arises as to the nature of the protection. At first thought, screening of windows occurs as the chief if not the only protective measure of importance. It was upon this point that the experience gained in our study of the previous summer was of very practical value. For the women of the lower East Side, a window possesses an importance of the first magnitude, and the suggestion of screening a window in such a way as to curtail ever so slightly its important social function will not readily be entertained. However, even if the screens were properly used and cared for, the influence which they would exert on the children from one to five, who are so largely in the streets and eating all kinds of street food, is probably not great. Consequently, it was decided that no attempt would be made to protect the children from one to five years of age, but that every effort should be concentrated on the infant under one year of age. The infant in its carriage or its go-cart, cradle, or bed, can be effectively protected against the fly by the proper use of netting. It was upon this that the greatest emphasis was laid. The insistent demand was that the netting must be over the baby. In order that there would be no tax upon the slim resources of these families, the Bureau provided the netting. About 1,000 yards of netting were thus distributed.

Hardly less vigorously were the covering of food, the removal of food scraps, the washing or covering of soiled diapers, etc., urged upon the families.

More to keep the fly in mind than to reduce its number, Tanglefoot fly paper was distributed weekly. Several carefully prepared types of fly literature, richly illustrated with effective cartoons, became another means of reaching the families in which protective measures were taken. Finally the importance of the visit of the nurse and the supervisor must not be underestimated. From thirteen to twenty-two visits were made to each family during the eleven weeks of the experiment. Instruction, admonition, encouragement and constant teaching of the mother how to protect her child, was a part of the nurse's contribution.

On the other hand, in the so-called unprotected or "control" group, the special measures with which the fly was combated, were not emphasized. Netting, literature, and fly paper were not distributed, though the nurses made an equal number of visits. In making these visits the nurses, while not dwelling upon the fly, observed all the conditions existing in the home and gave the usual sanitary and hygienic instruction customary to the Health Department nurses. Of course, when any case of sickness was discovered, regardless of the group, every effort was taken to restore the sick one to health. Children with diarrhea were sent to the milk stations for further diagnosis and treatment.

Inspection cards were filled out at every visit, record being made of the condition of the child, of the home,

of the nature of the child's feeding, character of milk supply, presence of flies, of food exposed, etc. Moreover, the supervisors also reported conditions found and thus provided a check on the nurses' reports. It was upon these reports that the final classification of the infants was made.

Plan of Analysis of Study.

At the close of the field work on September 15, the files contained some 18,000 observations upon some 1,200 infants. Included in these were several hundred regarding whom there were insufficient reports, owing almost entirely to the removal of the families from the neighborhood. As many as 200 cases were thus dropped. Those remaining had a minimum of eight visits and all had been under observation at least two months.

Early in the experiment it became evident that the division of 1,200 families into two similar groups, one in which the infant was protected against flies and the other in which flies were disregarded, created too arbitrary and inelastic a distinction to be successful. Within any group of such dimension there must be allowance for individual variation. Within the protected group the best and the poorest degrees of cooperation were found, and in the "control" group there were to be found those who were protecting the infant against the fly in a thoroughly creditable manner. Our observation in the matter was later substantiated by comparison of the diarrheal rates expressed in terms of the percentage of infants attacked by diarrhea, for the two groups. The protected group as such had a rate of 22.5 per cent., while the "control" had a rate of 20.5 per cent.—a result which gives little encouragement to the idea that real cooperation can be expected throughout a large group.

It was realized, of course, that the classification of each infant according to its particular degree of fly protection must be done with the greatest care and accuracy, else the results of the experiment would be of little worth. A method which allowed a maximum degree of reliability and the minimum of error was found. Upon the basis of the percentage of actual observations of netting over the baby, the netting efficiency and the degree of protection of the infant could be classified without depending upon any unstandardized personal impressions. The only ground for criticism existed in deciding what percentage of observations should determine good fly, fair fly, and poor fly protection. In view of the many conditions which in themselves made it impossible that the netting should always have been over the infant, such as during feeding, bathing, or while in its most active waking period, it is obvious that the netting could not always have been observed, even though the best protection was practised. After careful consideration, 40 per cent. or greater of positive observations was decided upon as the range for good protection, between 10 per cent. and 40 per cent. fair protection, below 10 per cent. poor protection. In this way, it is believed, an accurate classification has been obtained.

Similar methods were used in classifying the infants according to the san-

itary condition of the home, and type of feeding. By the very nature of the groups, however, the classification of the clean, fair and dirty homes cannot claim the same degree of reliability as is claimed for the fly-protection groups. In the first place, the judgment of the nurses necessarily played a large part, and such judgments do not allow of the most careful standardization. Furthermore, for various reasons a weekly observation on this point was not demanded, and the classifications are based chiefly on a general summary of the home conditions, provided by the nurses towards the close of the experiment, amplified by the detailed statement on the census card, the information frequently given voluntarily by the nurses, and the impressions of the supervisors. Where the information was considered insufficient, the card was placed in the unclassified group. Infants were classified as breast fed or artificially fed when 80 per cent. or more of the observations of the nurses were so recorded. When the percentage was lower than 80 per cent., as for instance, when 50 per cent. were breast, 30 per cent. artificial and 20 per cent. mixed, the case was classified as a mixed feeding case.

Age and nationality were two further sub-classifications. The age of the infant is that given by the mother at the time the census was made. The nationality of father and mother, due to the extensive international marriages, is frequently not the same. The policy of determining the nationality of the offspring by the nationality of the mother, which has been used by the United States Census Bureau, is here employed.

After each infant had been classified according to the groups before mentioned, all the information recorded by the nurses during the twelve weeks of visiting was transcribed in such form as to give a complete history of the condition of the experiment week by week. The weekly observations regarding netting over baby, and over go-cart, the type of feeding, exposure of milk, prevalence of flies and condition of the infant was summarized. The comparative efficiency of observation of the nurses could then be noted.

Particular care was taken with the reports of sickness. These were carefully reviewed and correctly classified by Dr. Anna von Sholly of the Health Department, under whose immediate control were the nurses during the field study.

The Separation of the Nurses into Two Groups.

Unfortunately, in an experiment of this nature, the quality of the work performed by a number of nurses is not likely to be of exactly the same standard. Close association with and careful supervision of the nurses necessarily gave the supervisors definite impressions in regard to the character and quality of their work. Feeling that the standard of accuracy of the study demanded a careful consideration of the possible unreliability of the work of some of the nurses, they were eventually divided by the supervisors into two groups designated as Selected nurses and Non-selected nurses, and

thereafter kept entirely separate. Each group consisted of three Bureau and three Health Department nurses. The separation was made at the close of the experiment, before any analysis of results was begun, and was based on the observations of the supervisors that the Non-selected nurses showed less conscientious interest in the experiment, and the records of their work were considerably less complete. Furthermore, when the comparison of the actual work of the two groups of nurses was made, the general impression regarding the nurses was substantiated, the Non-selected nurses making 14 per cent. fewer visits. Analyzing the diarrheal rates obtained by the two groups of nurses, marked inconsistencies were found not only between the two groups, but also within the Non-selected group itself. Moreover, the diarrheal rates of the Non-selected were lower in every instance, notwithstanding the similarity of the groups in practically every respect.

The exclusion of their work from equal consideration with the Selected nurses' work was then seriously considered, and the Bureau decided that while the work of the Selected nurses warranted separate interpretation and special emphasis, all the data should be presented and modified conclusions be drawn if necessary from the combined results. Lack of space, however, makes it quite impossible to present all these data, consequently, only the tables of the Selected nurses are given, with brief discussion.

By reference to Table I, Selected nurses, it will be noted that 22 per cent. of the infants in the good protection group had diarrhea, and 41 per cent. of the infants in the poor protection group. The method of measuring the influence of flies is that of dividing 41 per cent. by 22 per cent.,

RESULTS.

TABLE I—SELECTED NURSES.

FLY PROTECTION.

	Total No. infants.	Per cent. distri. infants.	Inf. attack by diar.	
			No.	Per cent.
Good protection..	254	53	57	22
Fair protection...	185	39	45	24
Poor protection ..	41	8	17	41
Total.....	480	100	119	25
Fly factor.....				1.9

whereby we have a factor (1.9) telling how much greater was the diarrheal rate in the one condition than in the other. *It may be said then that almost twice (1.9) as many infants had diarrhea among the fly-exposed group as among the fly-protected group.*

It will be natural to inquire at this point whether the diarrheal rates which are given for the good, fair or poor fly protection groups are really exclusively attributable to the protection, or whether other influences such as dirty homes, or artificial feeding may not be largely responsible for the high rate found, for instance, in the poor protection group? This question was examined with care, and the tests applied indicate that while occasionally a slight correction may be neces-

sary, as a rule, especially in the measurements of main factors, other conditions do not influence the results sufficiently to affect the conclusions. It is obvious that the size of the experiment does not permit the use of highly specialized statistical methods by which every contributing influence can be accurately measured, but by the available methods, namely, the elimination of any condition, such as artificial feeding, from the good protection and the poor protection groups, assurance may be had that the factor is not appreciably altered. While it is impracticable to discount the age influence in every case, it appears from careful scrutiny of the subgroups that the age factor is not of such importance as materially to affect any conclusions. It should be considered also that the summer had no intensely hot periods and that there was some supervision of the food.

TABLE II—SELECTED NURSES.

FLY PROTECTION ACCORDING TO CONDITION OF HOME.

	Good protection.			
	Total No. infants.	Per cent. distri. infants.	Inf. attack by diar.	
			No.	Per cent.
Clean	55	22	10	18
Fair	55	22	13	24
Dirty	28	11	7	25
Unclassified	116	45	27	23
Total	254	100	57	22
"Dirt" factor				1.4

	Fair protection.			
Clean	22	12	4	18
Fair	39	21	11	28
Dirty	26	14	8	31
Unclassified	98	53	22	22
Total	185	100	45	24
"Dirt" factor				1.7

	Poor protection.			
Clean	1	2	—	—
Fair	5	12	2	40
Dirty	18	44	8	44
Unclassified	17	42	7	41
Total	41	100	17	41
"Dirt" factor				

	Good, fair and poor protection.			
Clean	78	16	14	18
Fair	99	21	26	26
Dirty	72	15	23	32
Unclassified	231	48	56	24
Total	480	100	119	25
"Dirt" factor				1.8

Table II, Selected nurses, gives the data regarding the sanitary condition of the home, as observed under good protection, fair protection, and poor protection. The fourth section of this table combines the three preceding sections, so as to show only the sanitary condition of the home. Considering first this portion of the table it will be noted that the clean and the dirty homes are in about equal num-

ber, but the percentage of infants attacked by diarrhea is markedly different, viz., 18 per cent. for the clean and 32 per cent. for the dirty homes, or 1.8 times as many "diarrheal" infants in the dirty homes as in the clean homes. The infants in the fair (medium) homes and the large unclassified group occupy an intermediate position.

The significance of the so-called "dirt" factor should be carefully considered. Of course, the classification of the homes according to cleanliness or dirtiness is based on the objective appearance of the home. Objectively, a dirty home is one in which the visitor finds the remains of a meal on the table or in the sink, dirty clothes lying about, abundant evidence of dust and dirt, and the general appearance of slovenly housekeeping. Subjectively, a dirty home probably means that the mother is of a careless, easy-going disposition, lacking in pride and satisfied with the minimum standards of decency. Associated with these characteristics, a lack of systematic care of the infant, irregular and improper feeding and other unfavorable influences on the infant are likely to be found. With this in mind, and not before, the significance of the "dirt" factor may be grasped. Probably the dirt itself is of only moderate importance; it is used here only as a symbol of a combination of inferior qualities on the part of the mother, and unfavorable conditions in the home. Obviously, the reverse of these characteristics, objective and subjective, are to be expected in the clean homes.

Careful inspection of the last column of figures will show that the percentage of infants attacked by diarrhea within each protection group rises according as the home conditions become unfavorable. Also, a marked increase of rates for similar conditions of home is observed when the various degrees of protections are compared. There is a marked consistency in the increasing rates among these twelve classifications with the exception of the poor protection, clean homes group, which is so small as to be negligible.

While the artificially fed infants may be eliminated from the clean homes and the dirty homes without altering the "dirt" factor of 1.8, the same is not strictly true of the influence of poor protection. This, however, is largely owing to the absence of infants in the clean homes of the poor protection group. Had this group of clean homes a normal size and a consistent diarrheal rate, the "dirt" factor would probably be unaffected.

It may be said, however, that almost twice (1.8) as many infants had diarrhea in the dirty homes as in the clean homes. From this it appears that flies and so-called "dirt" are equally important in favoring diarrhea among infants.

The fly factor and the "dirt" factor, which have been discussed singly, may here be studied together. For instance, the diarrheal rate (41 per cent.) for the poor protection, dirty homes group may be compared with the rate (18 per cent.) for the good protection, clean homes group. This

gives a factor for the flies and "dirt" combined of 2.4, a measurement which is the same as that of artificial feeding.

TABLE III—SELECTED NURSES.

FLY PROTECTION ACCORDING TO TYPE OF FEEDING.

	Total No. infants.	Per cent. distri. infants.	Inf. attack by diar. No.	Inf. attack by diar. Per cent.
Good protection.				
Breast fed	180	71	36	20
Mixed fed	51	20	11	22
Artificially fed	23	9	10	43
Total	254	100	57	22
Feeding factor				2.2
Fair protection.				
Breast fed	131	71	26	20
Mixed fed	34	18	9	27
Artificially fed	20	11	10	50
Total	185	100	45	24
Feeding factor				2.5
Poor protection.				
Breast fed	22	54	8	36
Mixed fed	16	39	6	38
Artificially fed	3	7	3	100
Total	41	100	17	41
Feeding factor				2.8
Good, fair and poor protection.				
Breast fed	333	69	70	21
Mixed fed	101	21	26	26
Artificially fed	46	10	23	50
Total	480	100	119	25
Feeding factor				2.4

Table III, Selected nurses, presents in similar fashion the data concerning fly protection and type of feeding combined. Observing the last column of the fourth section of the table the association of a high percentage of diarrheal infants with artificial feeding will first be noted, the percentage being 50 per cent. as contrasted with 21 per cent. for the breast fed. *This indicates that almost two and a half times (2.4) as many infants had diarrhea among the artificially fed as among the breast fed.* It also indicates that artificial feeding is more important than either flies or dirt. In the three preceding sections of the table the percentage of "diarrheal" infants under each degree of protection increases according as the feeding is breast, mixed or artificial. Likewise the increase in the diarrheal rates for each type of feeding, according as the protection against flies is good, fair or poor, is very marked. It is unfortunate that the poor protection, artificial feeding group is so small, otherwise an interesting measurement of the importance of flies and artificial feeding could have been made by comparing the diarrheal rate with that of the good protection, breast-fed group.

It is because of this very considerable importance of artificial feeding that it is essential to determine to what degree this influence figures in causing the high rates attributed to poor protection or dirty homes. In addition to the method previously discussed, there is another method by which the influence of artificial feeding in determining the other factors may be shown to be necessarily small, so small in fact that it cannot invalidate the results. It will be seen that the artificially fed group is small in number, only 10 per cent. of the whole, while the breast fed group constitutes 69 per cent. of all the infants. Consequently, if the same proportion existed in all the subgroups, the influence of artificial feeding, with its higher diarrheal rate, could never be large, and it is a fact that the distribution of the artificially fed rarely exceeds 10 per cent., except in the older age groups.

The smallest groups used in determining a factor has been in the group of artificially fed infants in dirty homes where 9 infants with a diarrheal rate of 56 per cent. have been compared with 55 breast-fed infants in clean homes, with a diarrheal rate of 16 per cent., giving a factor of 3.5. A measurement based upon so few cases is not of course of great value, particularly when the very considerable influence of poor fly protection is not discounted. If the artificially fed infants in dirty homes under poor protection are eliminated the factor is reduced to 2.7. The artificial feeding factors show a gradual increase as the three degrees of protection are considered; viz. 2.2 for good, 2.5 for fair, and 2.8 for poor protection, with an average for the three degrees of protection of 2.4.

TABLE IV—SELECTED NURSES.

AGE.

	Total No. infants.	Per cent. distri. infants.	Inf. attack by diar.	
			No.	Per cent.
0–3 Months ...	151	32	29	19
4–6 Months ...	120	25	30	25
7–9 Months ...	118	24	32	27
10–12 Months ...	91	19	28	31
Total.....	480	100	119	25

In considering, in the simplified form of Table IV, the distribution and diarrheal rates of the infants according to age, an interesting condition is observed. The percentage of infants 0–3 months of age is the largest of the four age groups while the percentage of infants having diarrhea is the lowest. Each succeeding age group has a smaller percentage of infants, and a higher diarrheal rate. The increased influence of artificial feeding with accompanying decrease of breast feeding partially explains this. For instance, although not shown in any of the tables, the percentage of artificial feeding for the four age periods is 3, 7, 14 and 18 per cent. respectively and that of breast feeding 80, 73, 64 and 54 per cent. respectively. With this exception, the distribution of the age groups among other groups

may be said to be such as not to give undue weight to the age factor. The question of age influence is, however, especially subtle. Before trustworthy conclusions can be drawn many influences should be carefully considered. The nature of the experiment, however, does not permit of such detailed analysis.

TABLE V—SELECTED NURSES.

NATIONALITY.

(Grouped according to mother's.)

	Total No. infants.	Per cent. distri. infants.	Inf. attack by diar.	
			No.	Per cent.
American	13	3	4	31
Austrian	14	3	3	21
Irish	16	3	3	19
Italian	182	38	27	15
Jew	228	48	75	33
Polish	10	2	6	60
4 Other National.	17	3	1	6
Total	480	100	119	25

Of the six chief nationalities, the smallest group had the highest percentage of children attacked by diarrhea, viz. the Polish with 60 per cent. The next highest rate, 33 per cent., is that of the largest group, viz. the Jewish which constitutes 48 per cent. of the total number in the experiment. The term Jewish has been used somewhat loosely here, as constituting those whose mothers claimed Jewish, Russian, and Russian-Jewish nationality. The Americans come next in diarrheal rate (31 per cent.), although but a small part (3 per cent.) of the total number. The Austrian and Irish are next in order, with the Italians, the second largest group (38 per cent.) possessing the lowest diarrheal rate (15 per cent.). It is felt that great emphasis should not be placed on these nationality rates, with the exception of the Italian and the Jewish. The former are predominatingly clean and well protected, while the latter, though no less favorably placed as regards feeding, are more largely represented in the dirty and poorly protected groups. Here the figures are sufficiently large to say with some degree of accuracy that the Jewish infants are on the whole less favorably situated than the Italian. In the Jewish group 2.2 times as many infants had diarrhea as in the Italian group.

Conclusions.

While a full discussion of the combined tables representing the 921 infants in the study would be desirable, it is impossible to do more than to give the main factors as measured, and refer the reader to the report of the study to appear as Publication No. 91, where the tables will appear fully discussed. The main factors for the combined group of nurses are as follows: Fly, 1.4; "dirt," 1.8; artificial feeding, 2.4; flies and "dirt," 2.1, artificial feeding and "dirt," 3.5.

These differ from the factors obtained by the Selected nurses in only one appreciable particular, namely, the fly factor, and is undoubtedly owing to the absence of sickness among the poorly protected, artificially fed infants of the Non-selected group,

which elsewhere appears to suffer heavily.

As before stated, the conclusions, as based upon the work of the Selected nurses, have been given the major emphasis by the Bureau. The factors as measured are, fly, 1.9; "dirt," 1.8; artificial feeding, 2.4; flies and "dirt," 2.4; artificial feeding and "dirt," 3.5. These speak for themselves. Flies and "dirt" appear to be about equally important and practically double the amount of diarrhea which exists under the more favorable conditions. As measured together, their importance is still greater, equalling that obtained for artificial feeding, although this would probably have been higher if the milk supply had not been rather carefully supervised. Still greater in importance, though the measurement is less reliable than the preceding, is that of artificial feeding and "dirt" combined. The importance of all these conditions in the incidence of diarrheal disease among infants in New York City in the summer of 1914 is clearly established and the necessity for serious attack upon them is apparent.

Discussion.

Dr. E. C. Levy (*Richmond, Va.*): Whatever those health officers who live in northern sections of the country may believe as to the relation between the fly and certain diseases, we in the South know from observation and not because we are carried away by any fad, that this is a very real thing and a very big thing. It is utterly impossible to tell you in a few minutes why I personally believe it. But I will tell you one or two reasons and will confine myself to the single question of two diseases, typhoid fever and infantile diarrhea. I want to state very plainly that I do not believe we are able entirely to differentiate the spread of disease through flies and through other agencies which are capable of distributing human excrement, but with us in the South it is undoubtedly through that that typhoid fever is largely spread in cities, from the excreta of cases than from carrier cases in the community. I came to that conclusion after being health officer one year and read a paper on the subject at Winnipeg a good many years ago, in 1908, and it took a whole lot of courage to read that paper, too. For two years we tried in Richmond, after I came in office, to reduce typhoid fever by all the orthodox measures at that time, and did not reduce the typhoid death-rate significantly, but just as soon as we began to realize that human excrement in the community was the chief cause of typhoid fever, we got results at once, and the typhoid death-rate was cut down to just half of the lowest it had ever been before, and the water supply was entirely unchanged, and for the past six years in Richmond our typhoid death-rate has been constantly going down from an average of 78 deaths per hundred thousand for 26 years to an average of well under 20 for the last six years. Of course the latter rate is a rate that northern sanitarians should not be contented with, or southern either, but it represents far more to those of you who live in the North. As to infantile diarrhea, the parallel is almost perfect. I tried to test that out in a less thorough manner than the author has been able to do it, but one of the first things I did was to put three medical students in one district of the city where I was told infantile diarrhea was prevalent every year. These young men went over 35 blocks three times, having a general cleaning up of all such materials as could breed flies, and that year we had only three deaths from infantile diarrhea in that section, and one died one day after these young men got to work; only two died after that. I wish to say one word very closely correlated; that is, within the past three years in Richmond I have worked in connection with infantile diarrhea along the same line, of its being largely contagious, more by the materials being in the stool than there being carrier

cases, because here were these infants—it has heretofore been overlooked that you have a large part of the populace distributing human excrement in spite of being connected with sewers, namely, the babies. The advice to clothe very scantily indeed is carried to extremes in the hot summer months and in some instances they are not clothed at all. The diapers of the baby remain around with that dangerous material, so for the past three years the nurses have been told that, in instructing the mothers in the care of their babies, to emphasize over and above any other thing the care of the diaper and not to lessen their instructions on feeding and all those things, but to emphasize this above everything else. The result has been this, that in spite of good milk for five or six years, in spite of instruction by the nurses for two years, our annual death-rate from infantile diarrhea for two years averaged 134 per 100,000 inhabitants and the lowest rate was 122, the highest rate being 152, and it was in the year when the milk was better than ever and the nurses more numerous and better accustomed to their work. As soon as the other instruction was added, the care of the babies' excrement, the death-rate fell to 101 in 1912, and last year to 84, and this year we can still have four deaths more and not be as high as 75, a low mark of between 70 and 75 against a low mark of 122 and a high mark of 152. Now flies come in as one of the instruments by which this babies' excrement is carried from baby to baby and from house to house. It is exceedingly interesting, but I do not wish to take up more of your time by telling about it.

INCREASING DEATH-RATES FROM ORGANIC CAUSES.

Remarking the fact that in his community "deaths in those age-groups ordinarily affected by the preventable, communicable diseases are on the decrease, while those," in the upper age-groups, "affected by organic disorders are increasing at a surprising rate," Mr. F. J. Osborne, health officer of Orange, N. J., comments in his latest annual report as follows:

"Obviously these facts would carry more weight were the figures at hand giving the exact distribution of our population into age-groups, but we have no reason to suppose that Orange would attract a population made up essentially of young people in the prime of life, for this is an old residential city with no particularly attractive line of employment. Nor has there been any change in the general composition of the city in this respect during the years under consideration. It is, however—being a suburb of the country's greatest metropolis—peculiarly well situated for the action of those causes ordinarily given as contributing to the high mortality from organic diseases of the heart, liver, kidneys, and nerve centers. Some of these causes are alcohol, tobacco, drugs, and the alleged increase in the venereal diseases. Probably a more convincing argument could be formulated on the basic principle of maladjustment of our general living to the new conditions consequent upon nineteenth and twentieth century prosperity, with its sedentary life, excessive nerve strain, and thoughtless intemperance in matters relating to eating, drinking, working and playing. This seems more reasonable since this high mortality in the organic diseases seems far more pronounced in this country than in Europe. But whatever the causes may be, and however much we may dodge the issue by declaiming about our decline in general death-rate, the fact still remains that this abnormally high mortality in the age period beyond 45 years of age, due to organic diseases, is with us, is of comparatively recent date, is increasing annually, and merits the attention of all who may be interested in postponing the time of death. No saner suggestion seems to have been made than that each individual, at least those beyond the prime of life, say 30 years, should consult a reliable physician periodically for a complete physical examination of all the vital organs and functions of the body, in order that early precautions may be taken before the disorder becomes chronic."

Since the phenomenon mentioned has been also noted in other communities, these remarks, though not altogether novel, have an especial suggestive value in calling attention to a mortality problem of constantly increasing importance.

RURAL SANITATION.

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THE sanitary problem of our rural districts differs widely from that which confronts the health authorities of the cities. People in general consider that the country places offer better advantages to health than do the cities, and this belief is fostered by those who have charge of our bodies when they are afflicted—the invalid, the neurasthenic, the aged, the young mother, the tired business man, the sickly youth or maiden are advised to seek the rest and quiet, green fields, fresh pure air, and wholesome food which can be obtained only in thinly settled communities; but if we would believe only the half which some health officers say about the country and the farmer we must needs regard the rural districts veritable death traps and the farmer a Lord High Executioner.

Often articles written by some city health officer or sanitary expert appear in our daily papers or monthly magazines, especially in medical and sanitary journals, and in health reports, charging nearly all the ills and ails to which our poor bodies are subject at the door of the farmer or else these articles call attention in a loud voice to the unsanitary conditions obtaining on the farms and utterly neglect the most flagrant violation of all sanitary rules within their own city and possibly within a few feet of their domicile or office. In meetings of health officials or societies, papers dealing with some feature of rural hygiene will surely be presented but there will be grim silence on city sanitation. The rural districts, to my mind, need no defence, for, if there be a locality wherein one can live as our Maker intended, that place is the country. Let us consider briefly some of the conditions we find in the country and compare them as best we may with their analogues of the city.

One of the first and most important problems is that of housing and here the rural districts by far excel the city. The rural population is, with few exceptions, native American and these exceptions are of the best type of immigrants coming to this land. Thus in the very beginning are eliminated those peoples who are prone to overcrowd in their homes and who in groups of three or more families live in a space insufficient for even one family. The farmer's house is built for and occupied by one family and very hard to find is the farmer's home in which sufficient room is not provided for each member of the household; the rooms are light, airy, well ventilated, and sunny, and at night each person goes to a bed provided with sufficient bedding to keep warm; meals are served at a table in a large kitchen or dining-room; the young children have plenty of yard room in which to play without going into the road or street. The housing of our city people will vary according to the amount of money the family

has to use and these conditions are on a scale going downward from those which the millionaires can and do provide, to the miserable hovels built and owned by these same millionaires for occupancy by poor people. The problem of the health officer is not with the millionaire residences but with the houses occupied by laborers. These houses are built in height from two stories upward and then subdivided into tenements or flats and, in many instances, these flats intended for one family shelter two or more and even one room will be the abiding place of more than one family; some rooms will have no outside windows but will open into an air shaft; other rooms will have no opening except the door; the ventilation in many apartments is nil; the rooms are dark and gloomy; the beds in many instances are piles of rags in a corner or under a table and with no bedding except an old bag or dirty cloth; the children have no playground except the street. Which, I ask you, do you prefer? Hand in hand with housing comes the disposal of waste material. In the city all waste matter enters sewers and this is the ideal method of disposal or would be if landlords were required to install proper plumbing in their houses and buildings. The plumbing is far too often inadequate and faulty, allowing the escape of sewer gas and obnoxious odors. The sanitary appliances of the country are in nearly every instance the same that have been in use for many generations and while to some city health officers these seem improper yet it would be next to impossible to make any other arrangement and in fact no better device could be proposed for the country.

Often we read that some outbreak of typhoid fever can be traced to pollution of the city water supply by material from a vault located on or near a small creek or brook, a greater or less distance from the city, and immediately the farmer is railed at. Whose duty is it to see that the water supply of the city is unpolluted—is it the duty of the rural inhabitant or is the city water commissioner and the city health inspector paid for such work? I have seen no less than three thousand people living within a huge water basin under construction, through which flowed a stream of water already supplying a large metropolitan area and all waste from this population, together with refuse from many stables deposited within this basin. How could this waste material be prevented from entering this stream of water, and what must be the added danger when water was allowed to flood this contaminated area? If this water caused any disease, I am sure that some farmer's vault would have been labelled as the source of infection. Water supplies for congested centers of population are furnished by a more or less elaborate central collecting basin or reservoir supplied by rivers, brooks, or wells. In the country the water supply for domestic use comes from wells, one or more of which will be found on each farm. The location of these wells has for a long time been a source of annoyance to city health authorities but in my opinion the country well is not nearly as dangerous as we might be led to believe by its detractors who can

theoretically trace all kinds of disease to it. Typhoid fever is the disease most often traced to impure water but does this ailment flourish more in the country than in the city? I doubt it.

Contagious and infectious diseases are less prevalent in rural districts than in settled communities from the very fact that the population is so isolated and the means of communication deficient. Occasionally city epidemics of a contagious disease are traced through the milk supply to a farm—a fact to be regretted, and always the subject for much comment, but if epidemics of the same disease should be spread by a municipal fault there would be very little if any comment.

As to food, I fail to see where much improvement can be made in the country—milk, eggs, vegetables, poultry, are fresh; in the city, milk is from 24 to 96 hours old before it is delivered and then very often it has been treated in some manner by the milk contractor or dealer and even in some instances what passes for milk never saw a cow but was manufactured; eggs are months and even years old before the housewife purchases them; poultry is somewhat ancient; vegetables are wilted from their sojourn in the market. Under these conditions, and they are not overdrawn, rather the half is not told, which, think you, the country or the city furnishes the best food to the individual?

In this short paper I have endeavored to show a comparison between the city and the country districts of our broad land. Statements here made apply to no one section in particular but will apply equally to all parts. Yet in face of these conditions city health officials advocate teaching the farmer the right way of living, the necessity of having suitable sleeping apartments, the value of a proper relation between work and play, in fact they think the farmer's education in regard to all health matters has been sadly neglected. Can any fair minded person truthfully say that he prefers the North End of Boston or the Lower East Side of New York City to a farm in the country. Which individual, the inhabitant of these quarters or the farmer, is living the more healthful existence? Our wealthy people of the cities depart for the country or seashore at the first breath of summer—why this exodus if the country is so unhealthy?

Which has the preferable sleeping quarters, the poor city laborer in his 2 by 4 cramped, non-ventilated bedroom up "steen" flights of stairs in a brick block surrounded by other brick piles on three sides; the city millionaire with his tapestry hung boudoir in some city mansion possibly in a thickly settled quarter, or a farmer with his bedroom well ventilated and perfumed in summer with the scent of new mown hay?

In the city the poor people are, because of the greed of those who supply food products, far too often unable to buy the bare necessities of life and what they can provide is generally of an inferior grade; the city rich provide highly spiced sauces, salads, desserts, and foods fancy named; the farmer provides good wholesome food in abundance; who

of these is living the nearest to the standard considered the best? If there is any doubt, look at any representative of these classes and the answer is obvious.

Equalization of work and play periods for the country boy and girl is another topic for consideration. Nearly every boy and girl on a farm has certain tasks allotted to them. I personally do not believe those tasks seem irksome but on the contrary the children are ready and willing to perform their small part of the home duties, nor do I believe that those tasks are in the least bit harmful. I firmly think that the boy or girl who is required to perform some labor is thereby the better fitted to grasp life's problems and this training also teaches industry and self reliance. Not all country lads, like many of their city brethren, are industrious but are ready to avoid even the easiest task. Compare the physical, yea the mental condition of the country lad with a city boy of the same age and judge for yourself which is the better fitted. Carry this comparison to adult life, if you will, and see how many of our prominent men holding high positions in the business, professional, and political life are either farmers or sons of farmers. The farmer's child is taught industry and thrift in early life and this instruction remains uppermost to the end.

The pastimes of the country are much different than are those of the city but are more healthful and tend to promote better morals and higher standards of thought. The country lad has not the opportunity to attend three or four dances a week where he can perform some fandango, or attend the theatre, or a card party, because such amusements are not common in his locality.

I know just as well as does any other person that many changes could be made in the manner of living in the country, with advantage to the farmer and his family, but I am equally aware that for every change in the country a score of greater alterations could be made in city life and would be of greater profit to a greater number of human beings.

It seems to me that if city health officials would discharge their whole duty to the community there would be less talk of the farmer, and greater activity looking to improvement in housing conditions, in manner of living, in sanitation, in the care and kind of food offered for sale in our urban communities.

PROPOSED ALTERATIONS IN PROCEDURE FOR STANDARD METHODS OF WATER ANALYSIS.

EDWARD BARTOW, *Chairman.*

IN ACCORDANCE with a resolution adopted by the Laboratory Section of the American Public Health Association at the Rochester meeting, September 10, 1915, proposed new standard methods for the analysis of water and sewage are herein outlined for the information and criticism of the members of the association. The form in which it is proposed to publish the procedures is given. All members of the association and others interested in the analysis of water are invited to submit criticisms of these methods to the chairman of the committee. As it is necessary to consider such criticisms before their incorporation in the printed report, they should reach the chairman at Urbana, Ill., no later than April 10, 1916. Final action on the procedures will be taken at a meeting of the committee in Urbana, Ill., during the spring session of the American Chemical Society, April 17–21.

AVAILABLE CHLORINE.

In waters that have been treated with calcium hypochlorite or liquid chlorine it is frequently advisable to ascertain the presence or absence of available chlorine. As the reagents which have been proposed for its detection are not specific for chlorine but give similar or identical reactions with oxidizing agents or reducible substances, care must be exercised in interpreting the results of such tests; nitrites and ferric salts are of common occurrence, and chlorates also may lead to misinterpretation in waters treated with calcium hypochlorite.

Reagents.—1. Tolidin solution. One gram of *o*-tolidin, purified by being recrystallized from alcohol, is dissolved in 1 liter of 10 per cent. hydrochloric acid.

2. Copper sulfate solution. Dissolve 1.5 grams of copper sulfate and 1 cc. of concentrated sulfuric acid in distilled water and dilute the solution to 200 cc.

3. Potassium bichromate solution. Dissolve 0.025 gram of potassium bichromate and 0.1 cc. of concentrated sulfuric acid in distilled water and dilute the solution to 200 cc.

Procedure.—Mix 1 cc. of the tolidin reagent with 50 cc. of the sample in a Nessler tube and allow the solution to stand at least 5 minutes. Small amounts of free chlorine give a yellow and larger amounts a yellow green color.

For quantitative determination, comparison of the color is made with that of standards in similar tubes prepared from the solutions of copper sulfate and potassium bichromate. The amounts of solution for various standards are indicated in Table 13.

Concentrations greater than 0.10 part per million of chlorine require use of a stronger bichromate solution, containing 0.25 gram of potassium bichromate and 1 cc. of concentrated

TABLE 13.

PREPARATION OF PERMANENT CHLORINE STANDARDS FOR LOW CHLORINE CONTENT.

Value in chlorine	Copper sulfate solution	Potassium bichromate solution
Parts per million	*cc.*	*cc.*
0.01	0.0	0.8
.02	.0	2.1
.03	.0	3.2
.04	.0	4.3
.05	.4	5.5
.06	.8	6.6
.07	1.2	7.5
.08	1.5	8.7
.09	1.7	9.0
.1	1.8	10.0

sulfuric acid dissolved in distilled water and diluted to 200 cc. The proper amounts of solution for stronger permanent standards are given in Table 14.

TABLE 14.

PREPARATION OF PERMANENT STANDARDS FOR HIGH CHLORINE CONTENT.

Value in chlorine.	Copper sulfate solution.	Stronger potassium bichromate solution.
Parts per million	*cc.*	*cc.*
0.10	1.8	1.0
.20	1.9	2.0
.30	1.9	3.0
.40	2.0	3.8
.50	2.0	4.5
.60	2.0	5.1
.70	2.0	5.8
.80	2.0	6.3
.90	2.0	6.7
1.0	2.0	7.2
2.0	2.0	12.0
3.0	2.0	21.0
4.0	2.0	30.0
5.0	2.0	39.0
6.0	2.0	46.0
7.0	2.0	56.0
8.0	2.0	63.0
9.0	2.0	70.0
10.0	2.0	75.0

DISSOLVED OXYGEN.

Reagents.—1. Sulfuric acid. Concentrated (Sp. gr., 1.83–1.84).

2. Potassium permanganate. Dissolve 6.32 grams of the salt in water and dilute the solution to 1 liter.

3. Potassium oxalate. A 2 per cent. solution.

4. Manganous sulfate. Dissolve 480 grams of the salt in water and dilute the solution to 1 liter.

5. Alkaline potassium iodide. Dissolve 700 grams of potassium hydroxide and 150 grams of potassium iodide in water and dilute the solution to 1 liter.

6. Hydrochloric acid. Concentrated (Sp. gr. 1.18–1.19).

7. Sodium thiosulfate. A N/40 solution. Dissolve 6.2 grams of chemically pure recrystallized sodium thiosulfate in water and dilute the solution to 1 liter with distilled water. Each cc. is equivalent to 0.2 mg. of oxygen or to 0.1395 cc. of oxygen at 0° C. and 760 mm. pressure. Inasmuch as this solution is not permanent it should be standardized occasionally against N/40 solution of potassium bichromate. The keeping qualities of the thiosulfate solution are improved by adding to each liter 5 cc. of chloroform and 1.5 grams of ammonium

carbonate before making up to the prescribed volume.

8. Starch solution. Mix a small amount of clean starch with cold water until it becomes a thin paste and stir this mass into 150 to 200 times its weight of boiling water. Boil for a few minutes to sterilize. It may be preserved by adding a few drops of chloroform.

Collection of sample.—Collect the sample in a narrow-necked glass-stoppered bottle of 250 to 270 cc. capacity. The following method should be followed in order to avoid entrainment or absorption of atmospheric oxygen. In collecting from a tap. Fill the bottle through a glass or rubber tube extending well into the tap and to the bottom of the bottle. To avoid air bubbles allow the bottle to overflow for several minutes, and then carefully replace the glass stopper so that no air bubble is entrained. In collecting from the surface of a pond or tank connect the sample bottle to a bottle of 1 liter capacity. Provide each bottle with a two-hole rubber stopper having a glass tube extending to the bottom and a short glass tube entering but not projecting into the bottle. Connect the short tube of the sample bottle with the long tube of the liter bottle. Immerse the sample bottle in the water and apply suction to the outlet of the liter bottle. To collect a sample at any depth. Arrange the two bottles so that the outlet tube of the liter bottle is at a higher elevation than the inlet tube of the sample bottle. Lower the two bottles, in any convenient form of cage properly weighted, to the desired depth. Water entering during the descent will be flushed through into the liter bottle. When air bubbles cease rising to the surface raise the bottles. Finally replace the perforated stopper of the sample bottle with a glass stopper in such manner as to avoid entraining bubbles of air.

Procedure.—Remove the stopper from the bottle and add, first, 0.7 cc. of the concentrated sulfuric acid, and then 1 cc. of the potassium permanganate solution. These and all other reagents should be introduced by pipette under the surface of the liquid. Insert the stopper and mix by inverting the bottle several times. After 20 minutes have elapsed destroy the excess of permanganate by adding 1 cc. of the potassium oxalate solution, the bottle being at once restoppered and its contents mixed. If a noticeable excess of potassium permanganate is not present at the end of 20 minutes, again add 1 cc. of the potassium permanganate solution. If this is still insufficient use a stronger potassium permanganate solution. After the liquid has been decolorized by the addition of potassium oxalate add 1 cc. of the manganous sulfate solution and 3 cc. of the alkaline potassium iodide solution. Allow the precipitate to settle. Add 2 cc. of the hydrochloric acid and mix by shaking.

The procedure must be carried out to this point in the field, but after the acid has been added and the stopper replaced there is no further change, and the rest of the test may be performed within a few hours, as convenient. Transfer 200 cc. of the contents of the bottle to a flask and

titrate with N/40 sodium thiosulfate, using a few cubic centimeters of the starch solution as indicator toward the end of the titration. Do not add the starch solution until the color has become faint yellow, and titrate until the blue color disappears.

The use of potassium permanganate is made necessary by high nitrite or organic matter. The procedure outlined must be followed in all work on sewage and partly purified effluents or seriously polluted streams or sample nitrite nitrogen of which exceeds 0.1 part per million. In testing other samples the procedure may be shortened by beginning with the addition of the manganous sulfate solution and proceeding from that point as outlined.

Calculation of results.—Oxygen shall be reported in parts per million by weight. It is sometimes convenient to know the number of cubic centimeters per liter of the gas at 0° C. temperature and 760 mm. pressure and also to know the percentage which the amount of gas present is of the maximum amount capable of being dissolved by distilled water at the same temperature and pressure. If 200 cc. of the sample is taken the number of cubic centimeters of N/40 thiosulfate used is equal to parts per million of oxygen. Corrections for volume of reagents added amount to less than 3 per cent. and are not justified except in work of unusual precision. To obtain the result in cubic centimeters per liter, multiply the number of cubic centimeters of thiosulfate used by 0.698. To obtain the result in percentage of saturation divide the number of cubic centimeters of thiosulfate used by the figure in Table 11* opposite the temperature of the water and under the proper chlorine figure. The last column of Table 11 permits interpolation for intermediate chlorine values. At elevations differing considerably from mean sea level and for accurate work, attention must be given to barometric pressure, the normal pressure in the region being preferable to the specific pressure at the time of sampling. The term "saturation" refers to a condition of equilibrium between the solution and an oxygen pressure in the atmosphere corresponding to 158.8 millimeters, or approximately one-fifth atmosphere. The true saturation or equilibrium between the solution and pure oxygen is nearly five times this value and consequently values in excess of 100 per cent. saturation frequently occur in the presence of oxygen-forming plants.

Relative Stability of Effluents.

Reagent.—Methylene blue solution. A 0.05 per cent. aqueous solution of methylene blue, perferably the double zinc salt or commercial variety.

Collection of sample.—Collect the sample in a bottle holding approximately 150 cc. If the dissolved oxygen is low, observe precautions similar to those used in collecting samples for dissolved oxygen (p. 162). Use rubber stoppers or a cork stopper of good grade which has been boiled in water.

Procedure.—Add 0.4 cc. of the methylene blue solution to the sample in the 150 cc. bottle. As methylene blue has a slightly antiseptic property

*Table 11 is table 12 in Edition 2 of Standard Methods, p. 62.

be careful to add exactly 0.4 cc. Add the methylene blue solution preferably below the surface of the liquid after filling the bottle with the sample. If the methylene blue is added first do not allow the liquid to overflow as coloring matter will thus be lost. Incubate the sample at 20° C. for ten days. Four days' incubation may be considered as sufficient for all practical purposes in routine plant-control work. If quick results are desired incubate the sample at 37° C. for five days using suitable stoppers to prevent the loss and reabsorption of dissolved oxygen. The bacterial flora at 37° C. is different from the flora at 20° C. The lower temperature is more nearly the average temperature of surface waters and therefore the higher temperature should be used only when quick approximate results are essential. Observe the sample at least twice a day during incubation. Give a sample in which the methylene blue becomes decolorized a relative stability corresponding to the time required for reduction (See table 12). For routine filter control ordinary room or cellar temperature will give fairly satisfactory results. For accurate studies, room temperature incubation is very undesirable, as the fluctuations in temperature which are ordinarily not noticed are responsible for appreciable deviations from the true values of relative stability. If the samples are incubated less than 10 days at 20° C. and are not decolorized, place a plus sign after the stability value in order to indicate that the stability might have been higher if more time had been allowed. In applying this test to river waters it oftens happens that the blue coloring matter is precipitated either partly or completely through absorption by the clay which many rivers carry in suspension. True relative stabilities cannot be obtained for such waters except by determining the initial available oxygen at the start and the biochemical oxygen demand on incubation at 20° C. for 10 days. Germicides, such as calcium hypochlorite, if present in sufficient quantity vitiate the results. If a sample contains free chlorine, therefore, store it about 2 hours, or until the chlorine is gone, and then add methylene blue.

Table 12 gives the relation between the time of reduction in days at 20° C. and the relative stability number.

TABLE 12.

RELATIVE STABILITY NUMBERS.

t_{20}	S	t_{20}	S
0.5	11	8.0	84
1.0	21	9.0	87
1.5	30	10.0	90
2.0	37	11.0	92
2.5	44	12.0	94
3.0	50	13.0	95
4.0	60	14.0	96
5.0	68	16.0	97
6.0	75	18.0	98
7.0	80	20.0	99

S = Relative stability or ratio of available oxygen to oxygen required for equilibrium. Expressed in percent.

t_{20} = Time in days to decolorize methylene blue at 20° C.

The theoretical relation is,

$S = 100\ (1-0.794)\ t_{20}$.

The relation between the time of reduction at 20° C. and that at 37° C. is approximately two to one. It is desirable that each observer work out his own comparative 37° C. table or factor, but results should be reported in terms of 20° C. stability numbers.

A relative stability of 75 signifies that the sample examined contains a supply of available oxygen equal to 75 per cent. of the amount of oxygen which it requires in order to become perfectly stable. The available oxygen is approximately equivalent to the dissolved oxygen plus the available oxygen of nitrates and nitrites. The nitrites in sewage are usually so low as to be negligible.

Biochemical Oxygen Demand of Sewages and Effluents.

Relative stability method.—The relative stability method may be employed to obtain a measure of the putrescible material in sewages and effluents in terms of oxygen demand.

Procedure for effluents.—Divide the total available oxygen, including the oxygen of nitrites and nitrates, by the relative stability expressed as a decimal.

Procedure for sewages.—Make one or two dilutions with fully aërated distilled water of known dissolved oxygen content. Tap water may be employed if it is free from nitrates. Vary the relative proportions of sewage and water to be employed to give a relative stability of from 50 to 75. Unless proper seals are employed bring the water as well as the sewage to the temperature at which the mixtures are to be incubated before preparing the dilutions. During the manipulation avoid aëration. Having made the proper dilutions, determine the relative stability of each.

Calculate the oxygen demand in parts per million by the following formula:

$$\text{Oxygen demand is } \frac{O(1-p)}{R\ p}$$

In this formula O is the initial dissolved oxygen of the diluting water; p is the proportion of sewage; and R is the relative stability of the mixture. Ordinarily the available oxygen in crude sewages, septic tank effluents, settling tank effluents, and trade wastes can be neglected.

Sodium nitrate method.—For the determination of the biochemical oxygen demand the sodium nitrate method may be used. The method is based on the biochemical consumption of oxygen from sodium nitrate by a sewage or polluted water during an incubation period of ten days at 20° C. A reasonable excess of sodium nitrate does not give a higher oxygen demand, as do higher dilutions with aërated water. The oxygen absorbed from the air in applying the method to sewages is negligible.

Reagent.—Sodium nitrate solution. Dissolve 26.56 grams of pure sodium nitrate in 1 liter of distilled water. One cc. of this solution in 250 cc. of sewage represents 50 parts per million of available oxygen. The strength of the sodium nitrate solution may be varied to suit conditions.

Procedure for sewages.—Ordinarily disregard the initial available oxygen as it is very small compared with the

total biochemical oxygen demand. Add measured amounts of the sodium nitrate solution to the sewage in bottles holding approximately 250 cc. which have been completely filled and stoppered. Incubate for 10 days at 20° C. A seal is not required during incubation. The appearance of a black sediment and the development of a putrid odor during incubation indicates that too little sodium nitrate has been added. Methylene blue solution in proper proportion may be added at the start to serve as an indicator during the incubation. Domestic sewage usually varies in its oxygen demand from 100 to 300 parts per million, approximately 30 per cent. of which is used up at 20° C. in the first 24 hours. At the end of the incubation period determine the residual nitrite and nitrate. Determine the nitrate by the aluminium reduction method, followed by direct Nesslerization. To convert the nitrogen into oxygen equivalents, multiply the nitrite nitrogen by 1.7 and the nitrate nitrogen by 2.9. The difference between the available oxygen added as sodium nitrate and that found as nitrite and nitrate at the end of the incubation period is the biochemical oxygen demand.

Procedure for tradewastes.—Employ the same procedure using larger quantities of the sodium nitrate solution. Make the reaction alkaline to methyl orange and acid to phenolphthalein. Adjust an acid reaction with sodium bicarbonate, and a caustic alkaline reaction with weak hydrochloric acid. If the liquid is devoid of sewage bacteria seed it with sewage after adjusting the reaction.

Procedure for polluted river waters.—Determine the initial available oxygen. Unless the river water is badly polluted add 10 parts per million of sodium nitrate oxygen. Collect carefully to avoid aëration, three samples in 250 cc. bottles. To one sample add a definite quantity of sodium nitrate solution and incubate. Incubate the other two samples for the determination of the residual free oxygen, nitrite and nitrate. If there is free oxygen left, the bottle containing the sodium nitrate solution may be discarded. If there is no free oxygen determine residual nitrite and nitrate as directed under the procedure for sewage (p. 165), and calculate the oxygen demand.

The Analysis of Sewage Sludge and Mud Deposits.

Collection of sample.—Collect a representative sample of the material. In general more than one single sample should be taken from a spot, and a large number of small samples should be collected rather than a few large samples. If the surface layer is darker and a lower layer consists of pure clay, sample only the surface layer for analysis. Samples may be analyzed either separately or as composites of careful mixtures. After a few minutes' settling, roughly drain or siphon the excess water. Allow sewage sludge to stand for one hour before draining it free from excess water, unless it is essential to determine the moisture content of the sample originally collected. If sludge cannot be analyzed within twenty-four hours it is best not to employ air-tight bottles and to add

small quantities of chloroform to retard decomposition. At the time of collection carefully examine mud from the bottom of surface water for evidence of sewage pollution and macroscopic and microscopic animal and plant organisms. Record the predominant species. Note the physical appearance of the material, particularly its color, odor, and consistency. Express all analytical results in percentage on a dry basis.

Specific Gravity.

Weigh to the nearest tenth of a gram a wide-mouthed flask of 100 to 300 cc. capacity, according to the quantity of material available. Then completely fill the flask with distilled water to the brim, and weigh it again. Empty and fill the flask completely with fresh sewage sludge or mud. If the material is of such consistency that it flows readily, fill the flask to the brim and weigh. The specific gravity is equal to the weight of the sludge or mud divided by the weight of an equal volume of distilled water.

If the material does not flow readily, fill the weighed flask as completely as possible without exerting pressure during the procedure. Weigh and then fill the flask to the brim with distilled water. Let it stand for a few minutes, until trapped air has escaped, then add more water if necessary and weigh. The specific gravity is equal to the weight of the material divided by the weight of the distilled water less the weight of the water added. Record the specific gravity only to the second decimal place.

Moisture.

Heat approximately 25 grams of sludge or mud in a weighed nickel dish on the water bath until it is fairly dry. Dry the residue in an oven at 100° C., cool, and weigh. Repeat to approximate constant weight. The loss in weight is moisture.

Volatile and Fixed Matter.

Ignite, in a hood, the residue from the determination of moisture until all the carbon has disappeared. Cool the residue in a desiccator and weigh it. The residue is the fixed matter. The volatile matter is the difference in weight between the original dried sludge and the ignited sludge.

Total Organic Nitrogen.

Preparation of sample.—For the determination of organic nitrogen and fat dry approximately 50 to 75 grams of the sludge or mud in a porcelain dish first on the water bath and finally in the hot-water oven until all the moisture has disappeared. Grind the dry material to a fine powder and keep it in a glass-stoppered bottle.

Reagents.—1. Sulfuric acid. Concentrated, nitrogen free.

2. Copper sulfate solution. Ten per cent.

3. Potassium permanganate. Crystals.

Procedure.—Weigh accurately 0.5 gram of dried sludge or 5.0 grams of dried mud and put it in a 500 cc. Kjeldahl flask. Digest it with 20 cc. of sulfuric acid, or more if necessary, and 1 cc. of copper sulfate solution to assist the oxidation. Boil for several

hours until the liquid becomes colorless or slightly yellow. Oxidize the residue with 0.5 gram of potassium permanganate, and follow the "Procedure for Sewage" (p. 165).

The following method is convenient for routine work at sewage disposal plants. Digest 0.5 gram of dried sludge or 5.0 grams of dried mud with 20 cc. of strong sulfuric acid and 1 cc. of the copper sulfate solution in a 300 cc. Kjeldahl flask. After digestion for several hours, cool, transfer to a glass-stoppered 100 cc. flask, dilute with distilled water to 100 cc., and mix well. Transfer 50 cc. with a pipette into another 100 cc. volumetric flask, and make this portion alkaline with 50 per cent. sodium hydroxide, testing a drop of the liquid on a porcelain plate with phenolphthalein to insure neutralization. The formation of a floc usually indicates that the neutralization is complete. Pour the solution into a small glass-stoppered bottle and permit it to stand until the next day. Nesslerize an aliquot portion of the clear supernatant liquid, and calculate the percentage of nitrogen in the material.

Fats.

Fats are usually determined only on sewage sludge, but some mud deposits contain small quantities due to the presence of trade wastes.

Procedure.—Weigh, according to the quality of the sewage or mud, 0.5 to 25 grams of dry material. Add water to the weighed portion in a porcelain dish and acidify the mixture with N/50 sulfuric acid in the presence of litmus tincture or azolitmin solution indicator. Avoid adding too much acid as an excess gives too high results on account of fatty acid residues. Evaporate the acidified mixture to dryness on the water bath, and heat it in the hot air oven at 100° C. for two to three hours. Extract the dry residue with boiling ether, rubbing the sides and bottom of the dish to insure complete solution of the fat. Three extractions with ether are usually sufficient. Filter the ether solution through a 5 cm. filter paper into a small flask. Evaporate the ether slowly, dry the fatty extract for half an hour at 100° C., cool in a desiccator and weigh. If it is desirable, particularly with certain trade wastes, to determine the quantity of soap fat, determine the fats with and without the addition of acid. The difference between the amounts found by the two determinations is the amount of soap fat present.

Ferrous Sulfide.

The liberation of hydrogen sulfide on adding dilute hydrochloric acid to a sludge indicates the presence of ferrous sulfide. As ferrous sulfide quickly oxidizes on exposure to air, a quantitative determination of this constituent must be made immediately after collection of the sample.

Procedure.—Heat a definite portion of the sludge with hydrochloride acid in a flask. Pass the liberated gas through Bromin water or hydrogen peroxide. Determine gravimetrically the sulfate in the oxidizing solution, and calculate the equivalent of ferrous sulfide by multiplying the weight of barium sulfate by 0.376.

Biochemical Oxygen Demand.

The quantity of river mud most suitable for the determination of the biochemical oxygen demand ranges within certain limits, largely according to the amount of deoxygenating matter present. For examinations of river mud prepare a 1 per cent. stock solution in distilled water or tap water saturated with oxygen and free from nitrate; use in the test a dilution of this stock solution equivalent to a concentration of 1 to 10 grams per liter of mud. For examinations of fresh sewage sludge prepare a 1 per cent stock solution in a similar manner, but use in the test a dilution equivalent to only 0.1 to 1.0 gram per liter of wet material. For examinations of dried sludges, which have undergone more or less mineralization, higher concentrations may be required.

Procedure.—Place a measured portion of the sample, or the proper amount of the 1 per cent. stock solution of the sample, in a 300 cc. narrow-mouth, glass-stoppered bottle, and dilute it to the desired dilution with water saturated with oxygen. Determine the oxygen content at 20° C. of the waters that are used for dilution. This determination must be made before the mud or sludge is added, because iron sulphide in the mud or sludge rapidly consumes part of the dissolved oxygen. Incubate at 20° C. for five days.

Shortly before the determination of the oxygen remaining in solution at the end of five days rotate the bottle once or twice to mix its contents and allow sedimentation for about 30 minutes. Siphon the greater part of the liquid through a narrow bore siphon into a 150 cc. bottle, which has been filled with carbon dioxide. Reject the first 25 cc. of the siphoned liquid and allow a little to overflow at the end of siphoning. Determine the oxygen content of the solution in the bottle in the usual way (p. 162). Report the oxygen demand in grams of oxygen per 100 grams of dried mud or sludge.

Analysis of Chemicals.

The following sections describe the accepted methods for the analysis of the chemicals commonly used in the treatment of water.

Reagents.

1. Distilled water. In practically all the tests of chemicals it is necessary to use exclusively distilled water that has been freshly boiled to free it from carbon dioxide and oxygen.

2. Concentrated hydrochloric acid. Sp. gr. 1.20.

3. Standard hydrochloric acid. A N/2 solution.

4. Ammonium hydroxide. Redistilled; Sp. gr. 0.90.

5. Dilute sulfuric acid. Dilute 1 part of concentrated sulfuric acid with 3 parts of freshly boiled distilled water.

6. Methyl orange indicator. See page 163.

7. Phenolphthalein indicator. See page 166.

8. Bromine. Sp. gr. 3.14.

9. Standard stannous chloride. A N/20 solution. This should be frequently standardized by titration against a standard iron solution. One cc. of N/20 stannous chloride is equal to 0.0028 gram of iron (Fe) estimated in the ferrous state.

10. Sodium hydroxide, N/1. Free from carbonate. This should be frequently standardized by titration against a standard acid solution in presence of phenolphthalein indicator. One cc.

of N/1 sodium hydroxide is equal to 0.049 gram of sulfuric acid (H_2SO_4), or to 0.03645 gram of hydrochloric acid (HCl).

11. Sodium hydroxide, N/20. Free from carbonate.

12. Standard potassium permanganate. A N/10 solution. One cc. of N/10 potassium permanganate is equal to 0.0056 gram of iron (Fe) estimated in the ferrous state.

13. Alcohol. Ethyl alcohol, 95 per cent.

14. Sugar. Solid granulated cane sugar.

Sulfate of Aluminium.

Determine and report insoluble matter, aluminium oxide (Al_2O_3), ferric oxide (Fe_2O_3), ferrous oxide (FeO), basicity ratio, and, if present, free acid as H_2SO_4. If the material is what is known as "granular" sulfate mix it well before sampling. If it is in lump form crush it to ¼ to ½ inch size, mix, and sample it. It is unnecessary to grind the sample to a fine powder, but it is preferable to have the particles fairly uniform in size.

Insoluble Matter.

Treat 10 grams of the sample with 100 cc. of distilled water and digest one hour at boiling temperature. Filter through a weighed Gooch crucible and wash the insoluble matter with hot water freshly boiled to free it from carbon dioxide. Dry the crucible to constant weight at 100° C., cool, and weigh. Report the percentage of insoluble matter.

Oxides of Iron and Aluminium.

Dilute the filtrate from the determination of insoluble matter to 500 cc. with water free from carbon dioxide and thoroughly mix the solution. Transfer 50 cc. of the solution to a 250 cc. beaker, add about 150 cc. of water and 5 cc. of concentrated hydrochloric acid, and heat to boiling. Add ammonium hydroxide in slight excess; when the solution has been almost neutralized it is convenient to add a drop of methyl orange indicator and then to add about 0.5 cc. of ammonium hydroxide after the solution is neutral to the indicator. Digest at about 100° C. for a few minutes and filter. Some analysts prefer to wash this gelatinous precipitate with hot water by decantation, and some to wash it evenly distributed over the surface of a paper filter; either method may be used. It is difficult to free it completely from impurities and it is not necessary to do so unless unusual quantities of calcium, magnesium, sodium, or potassium are present. While washing the precipitate on the filter do not allow it to become dry, as it then packs and cannot be washed clean. After most of the water has drained, drying the filter may be hastened by placing it on a sheet of blotting paper. If much iron is present completely dry the precipitate, remove it from the paper, and ignite the paper separately. Finally, blast the precipitate, with free access of air to the crucible, for five or ten minutes, cool, and weigh as oxides of iron and aluminium ($Fe_2O_3+Al_2O_3$).

Subtract the content of total iron, expressed as ferric oxide (Fe_2O_3), from the weight of the combined oxides and report the difference as aluminium oxide (Al_2O_3), in percentage.

Total Iron.

As filter alum usually contains 0.2 to 0.3 per cent. of iron use a 10 gram sample for the determination of total iron. Treat the sample with 50 cc. of freshly boiled distilled water and add 5 cc. of concentrated hydrochloric acid and 1 cc. of bromine. Evaporate the solution to dryness, dissolve the residue in water, and wash it into a flask with sufficient water to make the volume about 50 cc. Add 50 cc. of concentrated hydrochloric acid, boil to expel oxygen, and titrate, as hot as possible, with N/20 stannous chloride.

If a 10 gram sample is used the percentage of iron (Fe) is equal to the number of cubic centimeters of stannous chloride used multiplied by 0.028. The percentage of iron expressed as ferric oxide is equal to the number of cubic centimeters of stannous chloride used multiplied by 0.040.

Ferric Iron.

As filter alum usually contains 0.02 to 0.04 per cent. of ferric iron use a 20 gram sample. Boil 50 cc. of distilled water to expel oxygen, add 50 cc. of concentrated hydrochloric acid, and add the sample while the solution is boiling. Keep it boiling till the sample is dissolved. The flask should be kept filled with carbon dioxide during this process by dropping in occasionally small amounts of sodium carbonate. When the solution of the sample is complete titrate it hot immediately with N/20 stannous chloride.

If a 20 gram sample is used the percentage of ferric oxide (Fe_2O_3) is equal to the number of

cubic centimeters of stannous chloride used multiplied by 0.020.

Ferrous Iron.

The content of ferrous iron is the difference between total and ferric iron. The percentage of ferrous oxide (FeO), is, therefore, equal to 0.90 times the difference between the percentage of total iron expressed as ferric oxide and the percentage of ferric iron expressed as ferric oxide. Report the percentage of ferrous oxide (FeO).

Basicity Ratio.

Transfer 50 cc. of the filtrate from the determination of insoluble matter to a 200 cc. casserole and dilute it to 100 cc. Boil the solution and titrate it at boiling temperature with N/1 sodium hydroxide in presence of phenolphthalein indicator. The percentage of acidity in equivalent of sulphuric acid (H_2SO_4) is equal to the number of cubic centimeters of sodium hydroxide used multiplied by 4.9. In this titration iron and aluminium are precipitated as hydroxides and any free acid is neutralized.

Calculate the percentage of sulfuric acid equivalent of the determined percentages of aluminium oxide, ferric oxide, and ferrous oxide by the following formula:

Percentage of acid equivalent = 2.8792 Al_2O_3 + 1.83 Fe_2O_3 + 1.36 FeO.

If this percentage of acid equivalent is less than that found by titration report the difference as percentage of free acid. If the percentage of acid equivalent is greater than that found by titration the difference divided by 2.8792 is percentage equivalent of the excess of aluminium oxide present. Divide this excess by the percentage of total aluminium oxide and report the quotient as the basicity ratio.

Lime.

Mix well the sample, which should contain no lumps. If foreign matter is present grind the sample to pass a 100-mesh sieve.

Place 20 grams of granulated cane sugar and 1 gram of the sample in a 250 cc. glass-stoppered bottle, tightly stopper, and mix the mass by rolling. Do not shake hard as much of the lime could thus be lost as dust. Then add 187.4 cc. of distilled water freshly boiled to expel carbon dioxide. This makes 200 cc. of sugar solution. The lime is mixed dry with the sugar and the water added later to keep the lime from lumping. After shaking the sugar solution one hour titrate 50 cc. of it with N/2 hydrochloric acid in presence of methyl orange indicator. The acid used is equivalent to the carbonate and hydroxide in 0.25 gram of the sample.

Filter the remainder of the sugar solution, discarding the first 25 cc. of filtrate. Titrate 50 cc. of the filtrate with N/2 hydrochloric acid in presence of methyl orange indicator. The acid used is equivalent to the hydroxide in 0.25 gram of the sample.

If a 1 gram sample is used the percentage of calcium oxide (CaO) is equal to 5.6 times the number of cubic centimeters of hydrochloric acid used in the second titration; and the percentage of calcium carbonate ($CaCO_3$) equivalent to the carbonate present is equal to 10 times the difference in cubic centimeters between the results of the two titrations.

Iron Sulfate—Insoluble Matter.

Treat 10 grams of the sample with 100 cc. of freshly boiled distilled water cooled to 30° C. or less. When solution is complete filter through a weighed Gooch crucible, wash, dry, cool, and weigh. Report the weight of the residue, in percentage, as insoluble matter.

Iron as Ferrous Sulfate.

Dissolve 1 gram of the sample and dilute to 200 cc. with freshly boiled distilled water cooled to 30° C. or less. Add 5 cc. of dilute sulfuric acid (1 to 3) to a 50 cc. portion of the solution and titrate with N/10 potassium permanganate. The percentage of ferrous sulfate ($FeSO_4.7H_2O$) is equal to 11.12 times the number of cubic centimeters of potassium permanganate used.

Acidity.

Shake 12.25 grams of the sample in a 50 cc. bottle with 75 cc. of 95 per cent. alcohol for ten minutes. Run a blank. Filter rapidly both sample and blank and wash rapidly with alcohol sufficient to make 100 cc. of filtrate. Titrate with N/20 sodium hydroxide in presence of phenolphthlein and subtract the result of titrating the blank from that of titrating the solution of the sample. The percentage of acidity, expressed as sulfuric acid (H_2SO_4), is equal to 0.02

times the number of cubic centimeters of sodium hydroxide used.

Soda Ash—Insoluble Matter.

Treat 5.305 grams of the sample with 200 cc. of freshly boiled and cooled distilled water. When solution is complete filter through an asbestos mat in a weighed Gooch crucible, dry, cool, and weigh. Report the weight of the residue, in percentage, as insoluble matter.

Available Alkali.

Dilute the filtrate from the determination of insoluble matter to 1,000 cc. and thoroughly mix. Titrate 25 cc. of this dilution with N/10 hydrochloric acid in presence of methyl orange indicator. The percentage of available alkali, expressed as sodium carbonate (Na_2CO_3), is equal to 4 times the number of cubic centimeters of hydrochloric acid used.

TUBERCULOSIS PREVENTORIUM FOR CHILDREN.

At the Annual Meeting of the Tuberculosis Preventorium for Children held at the Academy of Medicine, Dr. Hermann M. Biggs, president of the institution, announced that new-born babies of tuberculous mothers were now being saved from tuberculosis by taking infants away from their mothers and giving them the fresh-air cure in the New Jersey pine belt. At the present time 12 infants are being cared for, and if funds can be secured it is hoped to erect a special pavilion to extend this important work.

Doctor Biggs also reported that the institution cared for 678 children 4 to 14 years of age last year, all of the children gaining in health and strength. The average gain in weight was 7 pounds and one little girl from Brooklyn gained 22 pounds. The Preventorium provided a total of 67,763 patient days of which over 7,000 were wholly free at the expense of the institution, the rest being partly supported by the city.

According to Doctor Jacobi, this plan of combating tuberculosis is entirely new. "In principle," said Doctor Jacobi, "it is like the so-called Bang method which has proven so successful in eradicating tuberculosis from the dairy cattle in Denmark. I believe that this work with babies will prove an important factor in the anti-tuberculosis campaign."

The following officers were reëlected:

President, Dr. Hermann M. Biggs;
First vice-president, Mr. Alfred F. Hess;
Second vice-president, Mrs. Henry Phipps;
Third vice-president, Isaac N. Seligman;
Secretary, Morgan M. Mann;
Treasurer, Alex. S. Webb.

The society maintains an all-year-round fresh air institution at Farmingdale, N. J. (6 miles from Lakewood). The work is entirely free, and children from infancy to 14 years of age are accepted from tenement homes of New York City where some member of the family is afflicted with tuberculosis. They are kept for a period averaging four months.

Book Reviews.

How to Live. *By Irving Fisher and Eugene Lyman Fisk. New York: Funk and Wagnalls, 1915. Pp. 345. Price, $1.00.*

This is a manual of Personal Hygiene authorized by and prepared in collaboration with a large and distinguished board of the Life Extension Institute. The Introduction is by ex-president Taft. About half the book is devoted to a clear and wisely proportioned exposition of the principles of hygienic living. Nearly as great a space is devoted to the "Supplementary Notes." Here we have a fresh and interesting treatment of such subjects as Body-weight, Posture, Alcohol, Tobacco, Colds, and Eugenics. The exposition is simple and yet scientific; it is as specific as possible and does not end in generalities. The use made of vital statistics will compel thought and the plea for periodic physical examinations is strongly enforced. The bibliography of Nutrition, Alcohol, and Tobacco is of exceptional range and value. With somewhat singular taste the book is embellished with portraits of its numerous sponsors.

Percy G. Stiles.

Bacteriology for Nurses. *By Harry W. Carey, M. D. Philadelphia: F. A. Davis Co., 1915. Pp. 133, 17 illustrations. Price, $1.00.*

An Introduction to Bacteriology for Nurses is a book admirably adapted for the nurse who wishes to familiarize herself with modern views of infection and immunity.

The author states in his preface that it is difficult for anyone instructing nurses to decide just how much of the subject to attempt to teach. He has made a wise selection in this book, the outcome of a course of lectures given for several years to nurses of the Samaritan Hospital Training School, in Troy, New York. He has limited his description of bacteria and their functions to an outline, and details of the theories of immunity, so confusing to the average nurse, are not given. The destruction of bacteria is given considerable space and bacteria of the commmon diseases are discussed in detail. A valuable chapter gives the technique of preparation and the collection of material for bacteriological examination.

In his attempts to explain the terms infectious and contagious, the author is somewhat misleading when he states that diseases like pneumonia, plague and tuberculosis cannot be transmitted through the air or by coming into the presence of the sick. He apparently minimizes the danger of droplet infection.

The book might be used as a text-book for a very brief course in bacteriology, as it contains the salient points of the subject for the nurse to review from time to time.

Edith A. Beckler.

Vicious Circles in Sociology and their Treatment. *By Jamieson B. Hurry, M. A., M. D. Blakisten's Son & Company, Publishers, Philadelphia, Pa., 1915. 31 pages, 2 plates. Price, 80 cents.*

In this little book, Doctor Hurry points out the analogy between vicious circles in disease and vicious circles in sociology. In so brief a space, the author can hardly do more than list and classify the many vicious circles of poverty, disease, crime, inebriety, etc. This he does, however, in a graphic and stimulating way. His book is as full of texts for the social preacher and the social worker as it is of quotations from most of the writers on sociology.

His first plate and first three chapters deal with the various circles, and their interrelations. "The chief problem is poverty, the factor which complicates so many social disorders."

Two of the circles of poverty are:

"1. Poverty—malnutrition—debility—diminished earning power—poverty.

"2. Poverty—acceptance of low wages—charitable aid—perpetuation of low wages—poverty."

The vicious circle of disease is: disease—diminished earning power—loss of medical aid and proper food and care—greater susceptibility—disease. Doctor Hurry considers bronchitis,

rheumatism, and cardiac affections the most pauperizing diseases, after tuberculosis.

The author finds cause for hope rather than discouragement in the existence of these circles, inasmuch as a circle may be broken at any point, at more than one point at a time by coöperation, or at its weakest point. "The first task of the sociologist, therefore, is to extricate from the symptom-complex those dominant factors that constitute the Circle; to discover the weakest link in the unending chain, and to effect a breach at the point of least resistance."

His second plate deals with the breaking of this Circle, and if his concrete suggestions for cure are somewhat too simple (as for example—"Poverty—impaired health—low wages—*holiday*," and "Inebriety—dyspepsia—misery—*abstinence pledge*") his general thesis is irrefutable, and is stated in a useful way.

D. B. Armstrong, M. D.

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Sneezes Spread Diseases
Coughs Fill Coffins
Use a Handkerchief

Two of the "Watch Your Sneeze" poster stamp designs which the Bureau of Public Health and Hygiene of the New York Association for Improving the Condition of the Poor is supplying at cost to health officers, civic organizations, poster stamp leagues, public school, etc., in its campaign against grip and other respiratory diseases.

The design showing the two children received the first prize of ten dollars in a health poster drawing contest, conducted by the Association for Improving the Condition of the Poor in New York elementary schools.

The gummed stamps are printed in three colors and may be obtained for $1.25 a thousand by writing to the Association for Improving the Condition of the Poor, 105 East 22d St. Large posters may also be had at cost.

Health Department Reports and Notes.

REPORTS.

Edmonton, Alberta.

This report presented by Dr. T. H. Whitelaw, Medical Officer of Health, for 1914, is a record of effective work well and concisely interpreted. The occurrence of 16 cases of smallpox (11 being city cases), all in persons who had never been vaccinated, furnishes the health officer a text for a plea in support of compulsory school vaccination. In two families specially mentioned the school children, having been vaccinated, escaped, though freely exposed. "All unvaccinated persons in both families contracted smallpox, all vaccinated ones escaped." The health officer advises that a smallpox building might properly be placed with a proposed new isolation hospital, but fears that popular prejudice would militate against this.

One hundred and fifty-three dollars was expended for diphtheria antitoxin, for distribution free or at cost. It is recommended that the Provincial government arrange to supply antitoxin free to rich and poor alike.

Thirteen of the 50 city cases of typhoid fever were traceable to direct contact infection from a previous case as the probable source. Forty-six cases of erysipelas were treated at the isolation hospital, which was considered safer for that purpose than the general hospitals. Whooping cough proved to be a very serious matter, 403 cases with 21 deaths, which exceeded the total number due to scarlet fever, diphtheria, typhoid fever, and measles combined. Seventeen of these were in infants under one year of age.

The population of the city is stated as 70,000, but the mode of estimation is not mentioned.

Through a new by-law no meat can be legally sold in the city which does not bear the certified stamp of either a Dominion or city food inspector. Most of the city milk supply, it is stated, is now pasteurized. A special problem is created by the large number of individuals in the city who keep one or two cows and sell milk to their neighbors. It "seems scarcely fair" to the regular dealer, says the Health Officer, to exempt such persons from the equal operation of the milk regulations.

The health supervision of Edmonton was apparently conducted with efficiency and economy on a per capita total expenditure of approximately 31 cents, though this represents a considerable decrease under the previous year.

Columbia, South Carolina.

The report of this city of some 30,000 population, for 1915, consists largely of an account of the work accomplished under Dr. Skottowe B. Fishburne, who became Health Officer in June, and his recommendations for further improvement. Doctor Fishburne's first important official act was to secure a general sanitary survey of the city, which was performed with the assistance of Dr. J. C. Perry of the U. S. Public Health Service. This was followed later by a survey of the milk supply by an official detailed from the U. S. Department of Agriculture.

The sanitary survey is set forth in some detail, notably in a general table summarizing a house-to-house sanitary register or census. While certain items of such a detailed inventory may be of little or no value, *e. g.*, data of communicable disease which seem to assume "house infection" as of moment—others, such as the numbers and locations of privy-vaults, wells, and fly-breeding stables, have a real and important bearing on specific sources of disease which are well appreciated in this report.

The Health Officer makes a strong plea for the fly-proofing of surface closets, citing the reductions in typhoid fever which have resulted from this measure in Jacksonville, Fla., and Wilmington, N. C., notes the planned extension of sewers, and projects the gradual elimination of all unnecessary surface closets. The difficulty in making sewer connections being financial inability on the part of the property-owners, the recommendation is made that "the Constitution of the State be so amended as to allow municipal governments to pay for sewerage connections, and give the property owner a term of years to reimburse the city, the city taking a lien on the property as security," as is now done with street improvements. A new sanitary service for night-soil is under way, providing for tank wagons and

disposal by means of a hopper into the sanitary sewer.

The tables are clear and indicative, and a record of 129 cases taken to court and $146 in fines imposed indicates more than persuasion in enforcing sanitary ordinances. No financial statement is given. A very serious deficiency is the absence of vital statistics, laid to the fact that the records are not under the control of the health department. This lack is all the more conspicuous in that such statistics are the logical complement of the thorough sanitary survey which has been made, and, indeed, if available, should even take precedence of the latter, in order to give indication of such important considerations as infant mortality and tuberculosis. This, however, does not detract from appreciation of the lines of attack which have already been admirably opened up.

Baltimore, Maryland.

The report of this city, for 1914, opens with a discussion by the Health Commissioner, Dr. Nathan R. Gorter, of the lessened death-rate, which has been more marked in the white population and which he emphasizes as of sanitary significance through a demonstration of the decreases in child life, *e. g.*, in scarlet fever, diphtheria, and infant mortality. With the pasteurization of all milk, which is proposed, it is expected that the last-named mortality will be still further reduced. The disinfection of the public water-supply since 1911 has resulted in a reduction of typhoid fever, which will be still further reduced by water filtration and the extension of sanitary sewerage.

As an important aid to the efficiency of medical inspection of school-children, it is recommended that the city establish clinics, either in school buildings or at convenient points, to which children could be taken to have their teeth, throats, noses, and eyes more carefully examined than is possible in routine school examination and where proper treatment could be given.

An especially important start has been made in relieving the health department of a great deal of the routine of nuisance inspection at the same time securing greater efficiency in this work, by assigning definite duties in this line to police patrolmen. An order to such effect was issued by the police commissioners, and it is believed that there will be a successful development of the measure. The police, it is stated, have always been of assistance to the Health Department, but the individual officers were not made responsible for the cleanliness of their posts, as is now the case. Sanitary inspection in general, it is recommended, should be placed under a Bureau of Plumbing and Sanitation, so as to free the medical "health wardens" for more appropriate and important duties.

A conspicuous section of the report is that of the Bacteriologist, Dr. Wm. Royal Stokes, in which are discussed *in extenso* the city water-supply, typhoid fever, milk examinations, examinations of shellfish, diagnostic bacteriology, diphtheria control, etc. The report as a whole might well be preceded by a table of contents and list of the staff, with the addition also of a financial statement.

Palo Alto, California.

The report of this city of 5,200 population is a graphic proof of the fact that a small community can accomplish as high-grade health work and produce as creditable and interesting a report as those of larger size. Under the efficient execution of Mr. Harold F. Gray, a well-balanced control has been exerted since the inauguration of a new policy, in 1910, which provided for a full-time health officer and funds for office and laboratory equipment and maintenance. Since that time approximately 50 cents per capita per annum has been expended for purely health purposes. The present report, for 1914, is bound up with the municipal reports for the fiscal year 1914–15, hence its delayed appearance. A statistical review of the results of the new régime shows a steady reduction of the death-rate, which now, with inclusion of deaths of residents occurring in an out-of-town hospital, stands at the very low figure of 6.5. The decrease has been most marked in those causes of death which are amenable to sanitary control, and the indication is that the expectancy of life at birth has been increased by from ten to fifteen years. While certain sanitary evils which are rife in larger, more urban places do not exist in Palo Alto, it is evident that the health control there is of the first order and that this little city is one of the brightest spots on the health map of the country.

District of Columbia.

The report of Health Officer Dr. Wm. C. Woodward shows that the death-rate of the District, *i. e.*, city of Washington, for 1914 had declined to 16.59, the lowest ever recorded in the District. This was true also of the separate rates for white and for colored population, which were respectively 13.64 and 24.31. A considerable number of dwellings of the poorer sort, especially of the colored people, are situated in alleys and interior courts, and in the present report the deaths occurring in such are tabulated separately in some detail.

In his discussion of milk supplies, Doctor Woodward touches an important condition of pasteurization requirements when he says that "in the absence of regulations defining pasteurization, specifying the conditions under which it shall be performed, and providing particularly for its supervision and control by the health officer, much of the effort devoted by milk dealers to attempts at pasteurization is unsuccessful, their efforts and money are wasted, and the public is deceived into believing that milk labeled pasteurized has as a matter of fact been through a proper pasteurizing process, whereas such is not the case." Milk is graded in Washington under the classes of "ordinary raw milk," "special raw milk," and "pasteurized milk."

Because of the prevalence of rabies, muzzling of all dogs was required, but it is remarked that an increase in the pound force of the health department is requisite to take up unmuzzled dogs, while, on account of the impossibility of distinguishing tags and muzzles in the dark, no dogs whatever should be allowed to run at large at night.

Medical and dental inspections of schools were made much more efficient through the employment of school nurses. The work of the dental inspectors is summarized in the statement that 9,784 pupils were examined, teeth that needed filling being 25,940 and those that should be extracted 10,332, out of a total number examined of approximately 200,000; figures which sufficiently emphasize the importance of this branch of work.

The tables are very full and constitute the bulk of the report. Subjects on which one would expect to find more discussion are infant mortality and tuberculosis. The per capita per annum expenditure for health protective work in 1914–15 was approximately 35 cents.

NOTES.

Health Activities.—During the year ending June 30, 1915, Massachusetts, New Jersey and West Virginia have reorganized their health departments. The Bureau of Health of the Philippine Islands has been superseded by the Philippine Health Service. The model law for morbidity reports has been adopted in part by Ohio, Maine, Michigan, Delaware, Louisiana, Montana, Porto Rico, Vermont, Massachusetts and New York. Michigan has appropriated $100,000 for the purpose of making a tuberculosis survey of the state. Minnesota and Indiana have enacted advanced antituberculosis legislation. Louisiana, Mississippi and Texas have passed measures looking to the control of the bubonic plague. Maine legislates on milk, while many of the states have adopted laws or regulations looking to the control of communicable diseases in general. Medical inspection of school children has received legislative attention in Hawaii, Vermont, North Dakota, Porto Rico, Mississippi, New York, Kansas, and the Philippine Islands. Indiana authorizes the establishment of open air schools.—*Bulletin of State of Wisconsin.*

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Diphtheria Should be Controlled.—In Governor Whitman's address of welcome to the American Public Health Association at Rochester, he pointed out that diphtheria remains by far the most important of this group of the acute contagious diseases; and if, as I am assured, the 2,000 annual deaths from this disease in New York State are due largely to delay or neglect in applying a simple and efficient remedy in the form of diphtheria antitoxin—there is surely a grave responsibility resting upon the practising physician to remedy this deplorable condition of affairs.

There is not the slightest doubt about the facts. The use of antitoxin has reduced the diphtheria death-rate in New York State from

99 per 100,000 in 1894 to 20 per 100,000 in 1914. In pre-antitoxin days one person in every three who caught diphtheria died of it. Today, of cases which receive antitoxin after the fourth day of the disease, about one in twelve is fatal against one in fifty, in cases treated with antitoxin on the first or second day.

The antitoxin service of the State Department of Health has been completely reorganized during the past two years. The present product is of the highest purity. Every health officer keeps a stock of fresh antitoxin and physicians can at once obtain an ample supply for their needs.

The State Sanitary Code provides that "in every case of illness which there is reason to *suspect* is diphtheria, it shall be the duty of the attending physician or, if the local health authorities so require, of the health officer promptly to take material for cultures from the throat of the suspected person and submit the same for examination to a state, county, or municipal bacteriological laboratory, or to a laboratory approved by the State Commissioner of Health."

The use of city and county and state facilities for cultural diagnosis is the first essential step toward the control of this disease; and the occurrence of nasal diphtheria infections makes it desirable that cultures should be taken from cases of chronic nasal discharge, as well as from all suspicious cases of sore throat.

In many cases, however, the physician need not and should not wait for the laboratory test before taking steps to protect his patient. Every case in which the clinical symptoms suggest diphtheria should receive an immediate injection of 3,000–5,000 units of antitoxin.

Persons known to have been exposed to infection should have cultures promptly taken from their throats and noses, and immunizing doses of 1,000 units should be given. In institutions, a physician experienced to serology may use the Schick test to advantage in eliminating those, naturally immune, from the number to be treated.

The machinery for controlling diphtheria is in our hands. Let us use it.—*Monthly Bulletin*, N. Y. State Health Department.

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Experiment with Natural Water-Softening Zeolite.—Experimenting with a natural hydrous aluminum silicate in combination with calcium, which is capable of exchange with sodium in the raw state at a high rate and to at least as high a capacity as the synthetic product, R. N. Kinniard, chief engineer of the Des Moines Water Company, has succeeded in evolving a method of measurement of the rates of exchange in both directions of the reaction. He gave the following results to the Iowa Section of the American Waterworks Association, December 3. Des Moines city water, which has a total carbonate and sulphate hardness of more than 300 parts per million, has been softened in experimental filters. In the laboratory of Dr. Edward Bartow of the Illinois State Water Survey these Des Moines experiments have been duplicated with University of Illinois water having a total carbonate hardness of 300 parts per million. With a filter layer 2 ft. thick, rates of filtration of 2 gal. per minute per square foot and upward have been obtained with water of 300 parts per million hardness. This is equal to the rapid sand filtration rates and suggests the substitution of this natural medium either in gravity or pressure filters for municipal use.

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Present information indicates that 4 lbs. of salt can be counted on to convert completely 1 lb. of equivalent calcium carbonate to sodium carbonate, and Mr. Kinniard feels justified in saying that the indications are that this can be reduced. Assuming a ratio of four to one, and 300 parts per million hardness, 10 lbs. of salt would be required to treat 1000 gal. of water. Salt is marketed in carload lots at $3 or more per ton. Assuming $5 per ton, the chemical cost would be 2½ cents per 1000 gal., which figure can easily compete with lime and soda. The two processes, however, are not strictly comparable. The zeolite process gives a completely softened water without reducing the total solids. The lime process reduces the hardness by the amount of bicarbonates, while the soda process is only useful in that it converts calcium and magnesium sulphates to the sodium sulphates, which is exactly the same chemical substitution as is made by the zeolite.

Either alone or in combination with lime, Mr. Kinniard states, the zeolite process will be a most valuable finishing process.—*Engineering Record*, December 25.

Pneumonia.—In Rochester, every year between 300 and 400 people die of pneumonia. About 30 per cent. of the deaths are among little children, about 20 per cent. in middle life and about 50 per cent. in old age. Deaths from pneumonia would be very materially diminished if people would open their windows, wash their hands and keep their fingers out of their mouths; and if more attention were paid to the cleanliness of the teeth and mouth. One of the best ways to prevent pneumonia is to visit the dentist frequently; to brush the teeth and rinse out the mouth after meals, before breakfast and on going to bed; and not to have quack dentists anchor complicated dental bridges to rotten teeth. It is fair to predict, that when the new dental research work sets a new fashion in mouth cleanliness, then pneumonia will no longer remain the captain of the men of death.

In a former report, January of this year, reference was made to the work of Cole and Dochez on a new serum for pneumonia. This is not to be confounded with the shot-gun preparations put up by a notorious Michigan establishment. And, while much is to be hoped for the elaboration of Cole's method, much more will be accomplished by the prevention of pneumonia than in its cure by serums.—*Report of the Rochester Bureau of Health.*

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Vermont and Venereal Disease.—An act to prevent venereal diseases was passed by the Vermont legislature at its last session. The act makes it a crime for any person knowing himself to be afflicted with gonorrhœa or syphilis to marry. Physicians are required to report cases of venereal diseases and the State Board of Health is required to make and enforce regulations for the quarantine and treating of cases of gonorrhœa.

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California Endorses Federal Sanitarium Subsidy Bill.—The California State Board of Health has endorsed the federal bill which will provide for the payment of a subsidy to hospitals maintaining standards of equipment, diet, and care, established by the U. S. Public Health Service, and caring for tuberculosis patients who are not legal residents of the state in which they are.

This action was prompted in view of the following facts: the death-rate from tuberculosis in California and other southwestern states is very large, reaching, for example, the rate of 362.5 per 100,000 population in one county of the state and a corresponding rate of 192.5 for the state as a whole; this high death-rate is largely due to the influx, from all parts of the country, of tuberculosis patients, who are, for the main part, in advance stages of the disease and financially unable to provide proper care for themselves, and moreover, unable to exercise proper precautions to prevent others from becoming infected; 75 per cent. of the patients dying of tuberculosis in California have an annual family income of less than $1,000, furthermore, 27 per cent. of all children who have received state aid as orphans or half orphans during 1914 lost one or both parents from tuberculosis. There are only 906 beds available for tuberculous patients in county hospitals and the average yearly numbers of deaths is over 5,000. The counties cannot bear alone the double burden of caring for the resident and non-resident tuberculous, even with the recently provided state aid for the former. Recent investigations by the U. S. Public Health Service show that there is an annual migration of between 10,000 and 15,000 tuberculous patients to the western and southwestern states, and 30–50 per cent. of these die within six months of their arrival, and further, that 40–90 per cent. of all deaths from tuberculosis in the west and southwest are natives of other states.

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Summary of the Annual Report of the Surgeon General of the United States Public Health Service.—The annual report of the Surgeon General of the United States Public Health Service records the largest amount of work performed in the history of that organization. Since the passage of the law of 1912 the public health functions of the Service have materially broadened, thereby increasing greatly its usefulness to the American people. Throughout the report the economic importance of disease prevention is made apparent to the reader.

Perhaps the most important achievement of the year was the discovery that pellagra is a deprivation disease, resulting from a faulty diet containing an excess of carbohydrates. While the final experiments which led to this discovery have only recently been completed, the conclusion itself is the culmination of investigations

extending over a period of seven years. The work has consisted of epidemiological field studies, actual feeding experiments conducted at numerous places in Georgia and Mississippi, and experimental research at Spartanburg, South Carolina, and other places.

A new national quarantine station was opened at Galveston, Texas, and the control of the Boston station was transferred to the Public Health Service. A great reduction in immigration has been observed during the year, with a corresponding increase in the number of aliens certified. At the Port of New York, the percentage has risen from 2.29, previous to the development of the European conflict, to 5.37 since that time; this increase largely being due to the fact that with the decreased immigration more time can be devoted to the examination. The number of cases treated at marine hospitals and relief stations exceeded 55,000, 15,000 of which were hospital patients, a considerable increase over previous years. The Coast Guard Cutter *Androscoggin* was fitted out as a hospital ship and now affords relief to deep sea fishermen on the Banks of Newfoundland.

On the occurrence of plague at New Orleans, the first outbreak upon the Gulf seaboard, the state and local health authorities requested the Public Health Service to take charge of the situation. Extensive rat-proofing and other anti-plague measures were undertaken, resulting in the eradication of the disease from among human beings, and the practical extermination of the rodent infection.

Great reduction in the incidence of malaria was obtained in localities where surveys were conducted. Drainage projects, rice culture studies and the conditions surrounding the impounding of water for power purposes were investigated in order to eradicate as far as possible the disease in these areas. Scientific investigations of malarial infection showed that in the latitude of this country the most important agent in carrying the infection through the winter season is man, and not the infected, hibernating, Anopheles mosquitoes as was previously supposed. From the standpoint of prevention this is a discovery of considerable value.

Studies of occupational diseases and industrial hygiene were instituted at several places during the year. A survey of the industries of Cincinnati was made to determine the cause of the prevalence of tuberculosis among industrial workers. The investigations relating to the migration of persons suffering from tuberculosis were completed.

Upon the request of the health authorities of five states, the organization and operations of the respective boards of health were studied and recommendations advanced for improvement in the powers and duties of these bodies. The health organizations of several cities were likewise investigated.

Investigations of the pollution of streams and the examination of shellfish were also conducted.

Trachoma was combated in the Appalachian Mountains, where it is most prevalent, over 12,000 cases being treated. Surveys in certain states during the year showed that the disease is not an uncommon infection.

Rural sanitation work was conducted in six different states and everywhere resulted in the reduction of typhoid and other communicable diseases.

Public health laboratories for the prevention of the interstate spread of disease were established at Chicago, Seattle, and numerous other railway centers.

Additional duties have been imposed upon the Service by extension of relief benefits to the newly organized Coast Guard and the physical examination of seamen applying for the rating of "able seaman." For this reason, and because of the greatly increased health functions of the Service, an increase in the commissioned personnel is recommended. An additional building for the Hygienic Laboratory and the establishment of a National Leprosarium for the proper segregation and care of cases of leprosy are also recommended.

Public Health Notes.

Rural Sanitation Grows. Government is to Open New Bureau in St. Louis.—St. Louis, Mo., is to become the headquarters of the federal Government's rural sanitation work. Dr. M. J. White, now in charge of the Marine Hospital in that city, will be in charge, for a time at least. The new bureau will call for an annual appropriation of $30,000 to $50,000 from the fund set aside for national sanitation work and from ten to twelve expert chemists will be needed.

The hygienic laboratory has been at Washington heretofore, but government officials have decided the work can be done better with St. Louis as a central point. New Orleans has such a station for research into prevention of malaria. Savannah, Ga., has a station for investigation of pellagra, and Pittsburgh has a station for work in industrial sanitation.

The entire sanitation work of the government is in charge of Dr. L. L Lumsden of Washington, who will go to St. Louis to aid in establishing the new bureau. The work of rural sanitation by the government, Doctor White says, grew out of an epidemic of malaria seven years ago in North Yakima, Wash. About 3,000 persons were about to give up their homes, but the government sent physicians and chemists, who stamped out the disease. Since then rural sanitation has been regarded as a class of government work distinct in itself.

In many rural communities there was then a great need of instruction in sanitation. Some districts were much more healthful than cities, but, as a general rule, there was more danger of the spread of infectious diseases in the country than in the city.

"The great need of most rural districts," says Doctor White, "is common sense sanitation. The teaching of this is the great work of the bureau, together with the giving of aid when required. An important work is study of the causes of infectious diseases in rural communities."

Up to the present the efforts of the rural sanitation force has been confined largely to Alabama, Maryland, North Carolina, and Iowa, but with the establishment of the enlarged bureau in St. Louis Doctor White said that the work would become nation-wide in scope.—*New York Times*, November 19, 1915.

Improving Cancer Statistics in the United States.—The United States Bureau of the Census has instituted radical improvements in the collection and publication of the statistics of this disease. A special report on deaths from cancer in the United States during the year 1914 is in preparation and will be issued shortly after the first of the year.

In February, 1914, the American Society for the Control of Cancer suggested to the federal authorities that the figures of deaths from cancer in the United States Registration Area be published in greater detail, and that instead of being reported under only seven headings, as had been the custom hitherto, they be listed under many more titles according to the part of the body first affected, thus affording opportunity for more exact comparative study. This special monograph on cancer will consist of tables showing the deaths from cancer, according to the site of the disease, age, sex, color, nativity and marital condition, for the registration area, the several registration states and the usual subdivisions. Figures for white and colored will be shown separately for such counties and towns as have a colored population of 10,000, or at least 10 per cent. of the total. The new plan subdivides the seven titles for cancer in the International List of the Causes of Death into twenty-nine headings referring to the exact site of the disease. For instance, all deaths from "cancer and other malignant tumors of the buccal cavity" will now be reported under the separate subdivisions for cancer of the lip, tongue, mouth and jaw, and similarly with the other groups.

The Census Bureau also planned to increase the accuracy of the statistics by tabulating separately the returns in which the diagnosis was "reasonably certain" and those in which it was "uncertain." In arriving at this distinction a report is classed as "certain" if the diagnosis was confirmed by microscopical examination of tissues, or by surgical operation, or by autopsy. All cases of internal cancer in which the diagnosis was based on clinical observations alone are classified as "uncertain" regardless of any strength of assertion by the physician that the diagnosis was correct.

The improvement of cancer statistics has

practical bearings of greater consequence than may at first appear. Indeed, the importance of statistical investigation in arriving at the solution of the cancer problem is likely to be overlooked. Much of the valuable knowledge of the disease which we possess today has resulted from the collection and comparison of statistical data, and this method must be relied upon, side by side with experimental research and clinical observation, to elucidate the baffling problem of the nature and cause of this disease. The publication of this report by the Census Bureau should bring out new and useful information as to the prevalence of the disease in the United States and thereby contribute to the better understanding of its controllable features. Such a study as the Census Bureau is making, if continued, should also throw clearer light on the question of whether or not cancer is really increasing. By the progressive action of the Director of the Census data as to parts of the body affected on which such studies can be made will now become available for the first time in the official statistics of the United States.

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Infant Mortality and Natural Selection.—The *Texas Medical Journal* for December contains the following editorial, under the above title, thus showing another phase of infant mortality:

To state that two thirds of all deaths are due to heredity is rather startling. The casual observer would not likely attribute many deaths to this cause, but rather to conditions of environment.

Investigators, especially the school of Kare Pearson, have shown this to be true, and it is explained by them by the operation of natural selection in man. Death-rate is selective, and physical fitness is the criterion for survival. A heavy mortality leaves behind it a stronger population. The evidence lies in the fact that a high death-rate during infancy is followed by a lower death-rate during childhood. Part of children born in any district in a given year are doomed by heredity to premature death. This is due to a congenital lack of resistance to infectious diseases. In families of royalty, where environment is presumably the best, the death-rate from hereditary causes is 60 per cent.

This is not taken to mean that a high infant mortality is favored as a means of improving the race, but to show how the law of natural selection operates in man just the same as in the lower animal and vegetable kingdoms.

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Transmission of Pneumonia.—It may be remembered by older physicians that some of the European clinicians of the preceding generation, notably Johanessen, on purely clinical evidence advocated the isolation of pneumonia in consideration of the possibility that the disease may be transmitted from one person to another. The frequency with which pneumococci have been found in the mouths of normal individuals has until very recently seemed to preclude such a possibility, it seeming more likely that the infection might proceed from the patient's own mouth flora under conditions of depression of resistance or other localized vascular changes that favored the penetration of the pneumococcus into the lung. The studies of the last few years which have shown that pneumococci, though superficially alike, may nevertheless be separated, by agglutination reactions and protection experiments on mice, into a number of different types have made possible a return to the earlier point of view. It has been pointed out by these studies that the first three groups are disease-producing and give rise to three quarters of all cases of lobar pneumonia. A fourth group, which is responsible for about one quarter of pneumonia, are not easily distinguished from those normally found in human mouths. The other three, however, are easy to distinguish from the relatively non-virulent ones habitually inhabiting the mouth and pharynx. The highly virulent forms, moreover, of the first three groups, seem to grow in normal mouths only under special conditions. Dochez and Avery have found in pneumococcus infections with type I and type II the same microörganisms may appear in the mouths of members of the family or nurses in close attendance upon the cases. Such attendants may be "carriers" of this type for periods as long as 39 days, the average, however, being less than this. Patients recovering from pneumonia may harbor the organisms for considerable periods, varying in these studies from 12 to 90 days counted from the onset of the pneumonia. It is pointed out that both the healthy carrier who has obtained his organism from the case and the patient himself after recovery, may be active carriers

of virulent pneumococci. Inasmuch as these pneumococci are distinctly different from those found in the mouth normally, it is not at all unlikely that pneumonia may, like typhoid, diphtheria, and some other infections, be transmitted from person to person, at least in so far as the passing of the specifically virulent pneumococcus strain is concerned, this giving rise to the actual disease only in cases in which such transmission is coincident with physiological depression favoring the development of the infection.—*Journal of Laboratory and Clinical Medicine*, November.

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Typhoid Vaccines.—W. E. R. Schottstaedt, Fresno, Calif. (*Journal A. M. A.*, Nov. 13, 1915), says that the immunizing value of typhoid vaccines is generally admitted but there is some discord as to their use in treatment of the disease when discovered. No good index of immunity exists, but much careful work has been done, which he reviews. For his study five vaccines were employed, three of them made from the same strain, in two of which the bacteria were killed with 0.6 per cent. phenol (carbolic acid), and one in which the bacteria were killed by heating at 56 C. A fourth vaccine furnished by the California State Board of Health and the Mulford Typhoserobacterin bought in the open market were used. Twelve rabbits were taken, all about the same age. Two served as controls and the remaining ten were divided into pairs, one from each of the two litters used in each pair. The vaccine was injected into a vein of the ear. The summary of his investigations and his conclusions are as follows: There is a slight reaction following the injection of non-sensitized vaccines in rabbits, which is absent following the injection of sensitized vaccines. Vaccines killed by heat seem to be less active than those killed by the action of the phenol only. Washing the vaccine does not seem especially to influence its immunizing value. The height of the immunity curves occurs earlier after sensitized than non-sensitized vaccines, but the former appear to be only about one fourth as potent. The agglutinins practically disappear within three months after the first injection, while bactericidins and opsonins can be detected much longer. Opsonins increase more quickly than do agglutinins and bactericidins. Opsonins and bactericidins remain more permanent than agglutinins, and immunity is more likely due to the former than to agglutinins. Sensitized typhoid vaccines are less potent than non-sensitized typhoid vaccines, probably because the bacteria of sensitized vaccines undergo phagocytosis and bacteriolysis more rapidly. In conditions in which a prolonged reaction is desired, as in conferring immunity, the non-sensitized vaccines seem preferable. In conditions in which no general reaction is wanted and a quick response of the protective powers desired, as in active typhoid fever, a sensitized vaccine would seem preferable.

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Vaccine Treatment of Gonorrhœa (Lieutenant W. G. Brett, *Brit. Med. Journ.*, August, 1915).—The author remarks that any method of treatment which shortens the period of detention in hospital of men suffering from gonorrhœa is worth a trial and is undoubtedly advantageous to the military authorities. Thirty-three cases admitted into hospital and suffering from acute gonorrhœa were treated with gonococcus vaccine and were discharged cured after an average detention of 13.5 days. In no case was the patient discharged until there had been an interval of four or five consecutive days since the appearance of the last sign of discharge. This works out an average of about nine days during which there were manifestations of active gonorrhœa. One cubic centimeter of gonococcus vaccine (Burroughs Wellcome), 200 million cocci was given, and the urethra washed out three or four times a day with weak permanganate. Two days after the first injection of vaccine a second dose was given of 1,000 million cocci, and unless the discharge showed symptoms of diminution in two or three days a third injection of 1,000 million cocci was given. The author thinks that failures with the vaccine treatment are chiefly due to insufficient dosage.—*The Journal of State Medicine*, London, November.

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Mouth Hygiene.—In inventive genius, tireless industry and efficiency American dentists lead the world.

The progress made in this profession is continuous, and the importance of mouth hygiene on one's general health is only beginning to receive the recognition it deserves.

Like all other fields of hygiene, its cultivation should begin at a time when life habits are being

formed. The care given to teeth during infancy will show beneficent results during the remainder of one's life. The old belief that the first set of teeth need no care is untenable, for upon the care given them depends in large part the degree of perfection attained by the second set.

Diseased gums, abscesses and decayed teeth have the same pernicious effect upon infants and children that they have upon adults. Swallowing the poisonous discharges from these sources deranges digestion, poisons the system at large, and frequently causes attacks of acute illness that result in an immense amount of disability and not a few deaths.

Within the last few years Rosenau, of Chicago, has proven that diseased conditions in the mouth have a profound influence in producing localized inflammatory disease processes in other parts of the body. The growing number of cases of rheumatism cured by the removal of diseased teeth or tonsils furnishes unimpeachable evidence of the soundness of his work.

Examinations carried on in schools and covering thousands of cases have shown that the number of children with unhygienic mouths approaches dangerously near to an even 100 per cent. Most of the defects can be included under decayed teeth, diseased gums or infected tonsils. In some children all of the three are found, and it requires no strain of the imagination to picture the evil results of swallowing day after day the poisonous germs and products of decomposition that are thrown off.

Until children arrive at an age when they are able to brush their teeth, this method of preserving them should be done by the parents. Filling cavities in the first teeth is not only a form of insurance against rheumatism and possibly organic heart disease, but it is of benefit in insuring a better permanent set of teeth. Diseased tonsils are a constant source of danger, and their removal is the only logical method of avoiding this danger.

Diseased gums and abscesses about the roots of teeth are curable. The amount of suffering and inefficiency they cause is enormous. From experiments carried out in one of the Cincinnati public schools by the Cincinnati Dental Society, it was estimated that dental care for all the children in the public schools would mean an annual saving to the city of $50,000. This estimate was based on the time lost by children and the salary paid teachers.

Many consider dental work in public schools, paid for by general taxation, as a step toward socialism. It means greater efficiency, better health, and, in time of national danger, greater safety, for much of the disability suffered by the armies now at war in Europe is directly due to unhygienic conditions in the mouth. —*Bulletin Cincinnati Board of Health*, October 30.

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The Hygiene of Pregnancy.—Dr. Joseph Cates, M. O. H., points out that not an inconsiderable proportion of stillbirths and premature births are due to want of knowledge of the simple rules of the hygiene of pregnancy, and of the steps to be taken at the onset of a threatened abortion. "One cannot avoid the conclusion," he says, "that incompetence and careless negligence on the part of certain midwives largely contribute to the same end. In a certain town during 1913 an inquiry into the circumstances of 68 stillbirths showed that over 50 per cent. occurred during the ninth month of pregnancy, and that 30 per cent. of the children were macerated at birth. The causes to which the deaths were ascribed were, injury or shock to mother, 10; ante-partum hæmorrhage, 6; difficult labor, 7; ill-health of mother, 18; inattention at birth, 7; other causes, 20. It is rare, even among the better class of well-trained midwives, that a systematic and careful inquiry is made of the time of engagement to detect those dangers which, left untreated, may jeopardize the lives of mother and child. Neither have midwives generally the facilities to provide those articles of clothing indispensable to a well-arranged labor and lying-in." Dr. Cates adds that adequate accommodation for cases of difficult labor and for ailing and delicate infants is practically non-existent even in our largest cities.—*Medical Officer*, London, October 23.

Industrial Hygiene and Sanitation.

Illumination Hygiene.—In the U. S. Public Health Service Bulletin No. 71 on "Studies in Vocational Diseases," J. W. Schereschewsky reports in considerable detail on "The Hygienic Conditions of Illumination in Workshops of the Women's Garment Industry." From the standpoint of industrial hygiene, in this particular trade, which involves a close and continuous use of the eyes, the prevailing illuminating facilities are very important. The data of the report show that only a little over 25 per cent. of the workers, whose visual acuity was tested, had normal vision in both eyes.

The average prevailing conditions of illumination upon working planes was computed, and the results so obtained were used to find out whether the basic principles of illumination were adhered to in the workshops of this industry. Where departures from these principles were found to be prevalent, recommendations were made upon a good hygienic and economic basis.

In this report the general principles of natural and artificial illumination are discussed with diagrams, with a compact summary of the principles of such illumination. Following this is an extensive discussion of the results of the investigation and a summary.

The general conclusions are:

1. Adequate provisions for illumination are particularly necessary in the women's garment industries, (*a*) because of the exacting visual demands of the occupation; (*b*) because of the presence of a large number of visual defects in workers in this industry (vide Part I).

2. Photometric measurements made during the summer of 1914 in a group of 34 typical workshops show that the illumination was inadequate in the case of a little over one-half the working planes measured.

3. Departures from correct principles in illumination were common in shops. The effects of such departures are to produce: (*a*) Inadequate illumination; (*b*) glare effects; (*c*) lack of uniformity in distribution of illumination; (*d*) troublesome shadows.

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Cheap Insurance for Employees.—The Brooklyn Rapid Transit Company of New York City, taking advantage of the fact that the collective insurance premiums of its employees amount to a large sum, has secured for them at their option what is said to be the cheapest life insurance ever offered under a group plan. For men under 32, the annual premium on $1,000 is only $7.28. Furthermore, one half of the premium is paid by the company and no physical examination is required if the employee applies for his insurance within six months of the date his length of service (two years) permits him so to apply. When a man is retired on pension the company assumes his premiums, so that he has a paid-up policy at that time. Should he leave the employ of the company for any reason, he can convert his insurance practically at its face value, including the premiums paid by the company, into a standard life or endowment policy without physical examination. Already 65 per cent. of this company's employees have availed themselves of this arrangement to take out policies on which their share of the premium will be $28,000 annually. A like sum to be spent annually by the company will prove to be a good investment. It is a very encouraging sign to see the management of a large public-service corporation appreciating the value of spending a little money and effort in the interests of its employees. Action of this kind is well worth the study of engineers and contractors handling large numbers of men. —*Engineering Record*, January 15.

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The Problem of Industrial Fatigue Among Munition Workers.—The war has created a demand for munitions out of all proportion to anything contemplated previously in this country. Overtime on a large scale and even Sunday labor became the rule, and soon statements were made that the health of the workers was being injured by the long hours. The government therefore appointed a committee of physicians, physiologists, officials and others to consider and advise on questions of industrial fatigue, hours of labor and other matters affecting the health and physical efficiency of munition workers. A report has been published on Sunday labor and industrial canteens, and a report is in preparation on such subjects as welfare supervision, hours of labor, the employment of women,

sickness and accidents. With regard to Sunday labor, the committee has come to the conclusion that it should be everywhere discontinued except for the tending of furnaces and other work which must be continuous. Except for quite short periods, continuous work is, in their opinion, a profound mistake, not only on social and religious grounds, but also economically, as the output is not increased. This is so not only because men become bored and wearied with monotony of the work, but also because over a large period the actual number of hours worked is found to be greater when the regulation weekly hours are reduced. Thus, in one case the regulation hours were reduced from 78½ to 65½ per week, yet the average number actually worked during the three months succeeding the change was 60 per week, while the average in the preceding six months was 59¼. The committee also thinks that the foremen and even the higher management require definite periods of rest even more than the manual workers.

On the subject of food the committee considers that industrial alcoholism is partly due to the lack of cheap good food. The provision of dining rooms near the factory and industrial canteens has been found to be a great improvement on going home for meals. After their establishment a reduction in sickness, less absence and broken time, less tendency to alcoholism, and increased efficiency in output were observed.—*Journal of the A. M. A.*

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Great Britain to Prohibit Lead Paints.—The British Departmental Committee, appointed to investigate the danger of the use of paints containing lead to the health of persons engaged in painting buildings, has recommended principally the enactment of a law prohibiting the importation, sale or use of any paint material containing more than 5 per cent. of its dry weight of a soluble lead compound. Certain exemptions are recognized to be necessary, such as certain classes of colors, used by artists, and special branches of the painting industry, but in such cases it is considered desirable that the home secretary be given power to enforce adequate preventive measures. In order to give adequate time to the paint makers to arrange for the new type of supplies, and for the introductions of modifications in painting methods it is advocated to allow three years before enforcing the act, after the report has been published. The proposal to deal with the dangerous practices of the industry by regulation was regarded as impossible.

The white-lead industry in Great Britain in 1910 produced 58,000 tons, 85 per cent. of which was for home consumption. It employed approximately 2,500 persons with annual wages of $750,000. The capital invested amounted to $6,500,000. In lead mining approximately 2,700 persons were employed, with annual wage payments only slightly less than in the white-lead industry. It was estimated that the prohibition of the use of white lead according to the committee's recommendations would limit the demand for this material to 23,000 tons and would also reduce the demand for pig lead by about 25 per cent.

Among the persons employed as house painters in England and Wales, about 30 deaths from lead poisoning are reported each year. As to the number of non-fatal cases there are no complete statistics, since house painters do not come under the factory acts and reports of cases are entirely voluntary. However, the number of non-fatal cases is estimated at about 750 per annum.

Zinc paints will naturally take the place of lead paints, and though the production of zinc oxide is small, the larger call for zinc paints should stimulate an increase of production in this industry.

Legal Decisions.

Conditions Not Rendering City Liable for Typhoid Fever *City of Duncan v. Tidwell (Okla.), 150 Pac. R. 112.*—The Supreme Court of Oklahoma reverses a judgment for $675 obtained by plaintiff Tidwell, against the city of Duncan, as damages for typhoid fever suffered by members of his family, and alleged to have been caused by the defendant's negligence in respect to the condition of its dumping ground, which was on a lower plane and 1,940 feet southeast from the plaintiff's dwelling house, about 2½ miles northeast of the defendant city. In

this dumping ground it appeared that dead animals and human excrement, with other garbage, perhaps, were deposited in trenches 4 or 5 feet deep, the dead animals being covered with dirt and the excretions with lime and, when the trenches were about full, with dirt, although more or less of both were sometimes exposed. There was also some evidence tending to show an abundance of flies both at the dumping ground and at the plaintiff's house. The court holds that, in the absence of evidence reasonably tending to exclude other sources from which the *Bacillus typhosus*, causing typhoid fever, might have been derived, or to show that such bacillus existed in any of the matter deposited in the defendant city's dumping ground, it could not be inferred that members of the plaintiff's family contracted said disease from said dumping ground, located as above stated, notwithstanding that the winds had blown from that direction toward the plaintiff's dwelling house, and that there was an unusually great number of flies at said ground and at said house during the summer preceding the attack of such fever. The court says that it ventures no opinion on the question as to whether the jury might have found that flies or dust could have carried typhoid bacilli from the dumping ground to the plaintiff's dwelling house, or to any place where the afflicted persons were, but it contents itself with pointing out that there was no evidence reasonably tending to prove that they did so, or that these grounds were the source from which the disease was contracted.—*Journal of the A. M. A.*

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Venereal Disease—Ground for Annulment of Marriage *C v. C, 148 N. W. Rep. 865 (Wisc.).*—The plaintiff, the wife, sued for divorce and the defendant, the husband, counterclaimed asking annulment of the marriage on the ground of fraud, in that the plaintiff was knowingly infected with gonorrhœa at the time of the marriage and had infected the defendant. These allegations were shown by the evidence and the lower court entered judgment annulling the marriage. In its opinion the supreme court said:

"Considerations of morality and health alike dictate that neither spouse should be compelled to submit to the indignity and menace presented by such an infection. The fact that, through the fraud and concealment of the guilty party, the other has, without his knowledge and consent, already been infected aggravates rather than palliates the fraud, and can not of itself be considered a confirmation of the marriage."

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A Decision on the Harrison Law.—NARCOTIC DRUGS; HARRISON LAW; AMOUNT WHICH A PHYSICIAN MAY PRESCRIBE NOT LIMITED *United States v. Friedman, 224 Federal Reporter 276.*—An indictment under the Harrison Anti-narcotic Law charged that the defendant dispensed, distributed and prescribed the drugs enumerated in the act in quantities larger than necessary to meet the immediate needs of a patient and did not distribute, dispense and prescribe the drugs in good faith and as a medicine. The defendant demurred to the indictment upon the grounds, among others, that the acts of the defendant stated in the indictment are not in violation of any law of the United States. The court said:

"As I understand section 2 of the act, the only thing required of a person, who shall give an order as provided in said section for the drugs mentioned in the act, is that he shall make or cause to be made, at the time of giving the order, a duplicate thereof, on a form issued by the Commissioner of Internal Revenue, and in case of the acceptance of said order he shall preserve such duplicate for two years. The defendant is not indicted for failure to do either of these last-mentioned things. . . .

"I fail to find in the act of Congress under examination any language making the doing of the things with which the defendant is charged a violation of law. In other words, there is no limit fixed to the amount of said drugs that a physician may prescribe, nor is there any duty imposed upon him, other than to keep a record of all such drugs dispensed by him, and the name and address of the patient, except those to whom he may personally administer, and that he must preserve the records for a period of two years."

Personal Notes

The following applicants have been elected to membership in the American Public Health Association:

Wm. Evan Lewis, 27 N. Fifteenth St., Allentown, Pa. Instructor in Chemistry, Lehigh University.

Geo. Van Ness Sheridan, 1998 Summit St., Columbus, Ohio. Executive Secretary, Ohio State Medical Association.

Frank E. Hale, Mt. Prospect Lab., Flatbush Ave. and Eastern Parkway, Brooklyn, N. Y. Chemist, Director of Laboratories.

Harry F. Ferguson, State Water Survey, Urbana, Ill. Sanitary Engineering, Illinois State Water Survey.

Thomas J. Murray, Agricultural Experiment Station, Blacksburg, Va.

Roy Walter Pryer, Board of Health, Detroit, Mich. Director of Laboratory, Detroit Board of Health.

Winfred De Witt Vosbury, 601 Market St., Camden, N. J.

John O. McDonald, 190 W. State St., Trenton, N. J. Physician.

Earl H. Cummins, 46 Westland Ave., Boston, Mass.

Frank Geo. Boudreau, M. D., 305 17th Ave., Columbus, O. Physician.

Richard Orin Webster, 1625 Transportation Bldg., Chicago, Ill. Bacteriologist, Bureau of Chemistry, Department of Agriculture.

Judd B. Kelly, 540 2d Ave., Detroit, Mich.

James J. Hagan, 331 Baldwin Ave., Jersey City, N. J.

Frank L. Kelly, M. D., 2241 Parker St., Berkeley, Cal. Physician.

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Major-General William C. Gorgas received the Geographic Society of Chicago gold medal for his work in the Panama Canal Zone, January 8, and addressed the Society on "Sanitation in its Relation to Geography." The honor conferred on General Gorgas has been conferred on but two occasions previously, once to Captain Roald Amundsen for the discovery of the South Pole, and, the second time, to Major-General George W. Goethals for the construction of the Panama Canal. While in Chicago General Gorgas also spoke on "Sanitation and Single Tax" at a banquet given in his honor January 10 by the Chicago Single Tax Club, the Chicago Medical Society, the Illinois Manufacturers' Association, the Chicago Dental Society, the Lawyers' Association of Illinois, the Women's City Club, the American Chemical Society, the Medical Reserve Corps of the U. S. Army and the Illinois National Guard.

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Dr. John S. Billings Designated Deputy Commissioner.—In order to carry on the large amount of administrative work heretofore performed by the Deputy Commissioner, Dr. John S. Billings, until now Director of the Bureau of Preventable Diseases, has been designated to act as Deputy Commissioner. His place as Director of the Bureau of Preventable Diseases has been taken by Dr. Bertram Waters, heretofore Chief of the Division of Tuberculosis in that Bureau. Dr. Clifford D. Martin will act as Chief of the Division of Tuberculosis. The changes are official designations by the Board of Health and carry with them no changes in salary or civil service titles.

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Dr. Samuel G. Dixon has been elected president of the Academy of Natural Sciences, Philadelphia, for the twenty-first time and executive curator for the twenty-fifth time.

CURRENT PUBLIC HEALTH LITERATURE.

AMERICAN.

Albany Medical Annals, Albany.

XXXVII. January.

The Cocaine and Morphine Laws. L. R. Williams.
The Relation of the Practicing Physician to the Health Officer. P. V. Winslow.

American Journal of Diseases of Children, Chicago.

II. January.

Familial Syphilis. P. C. Jeans.
The Nutritive Value of Boiled Milk. Amy L. Daniels, Sylvia Stuesay.

Boston Medical and Surgical Journal, Boston.

CLXXIII. December 9.

Examination and Prophylaxis for Syphilitic Patients and their Families. Helen M. Wright.

December 16.

A Few Economic Facts of the Syphilis Problem. Donald Gregg.
A Chemical Aid in Securing Spirocheta Pallida from Syphilitic Lesions. Henry D. Lloyd.
A New Method of Tabulating Morbidity Statistics in the Medical Division of the Health Department of the City of Boston. Editorial.

CLXXIV. January 6.
Epidemics of Respiratory Infections. Editorial.
Compulsory Industrial Health Insurance. Editorial.
January 20.
The Injured Employee and the Workmen's Compensation Law. Results of Impartial Examinations. Francis D. Donoghue, M. D.

Delaware State Medical Journal, Wilmington.

V. September.
Use of Liquid Chlorine for Sterilizing Water. J. A. Kienle.

Engineering Record, New York.

LXXIII. January 1.
War and Waterworks Chemicals. Editorial.
Activated-Sludge Sewage Treatment. Editorial.
New Quincy Intake Characterized by Provision against Accumulation of Sand. Editorial.
Experts Testify on Means of Eliminating Odors in Garbage Reduction.

Journal of the A. M. A., Chicago.

LXV. December 4.
Efficient Dispensary Clinics as Requisite for Adequate Coping with Venereal Disease. Michael M. Davis.
A Statistical Study of Syphilis as Seen in the Outpatient Department of the University of California Hospital.
December 11.
The Economic Waste of Sickness and Premature Death. Norman Bridge.
Physical Examination and Regeneration of Employees. S. M. McCurdy.
Occupations and the Venereal Disease. W. F. Snow.
Sickness Insurance: a Preventative of Charity Practice. B. S. Warren.
Significance and Prevention of Amebic Infections in the Mouths of Children. A. W. Williams.
January 25.
Tropical Sanitation and Its Relation to General Sanitation. W. C. Gorgas.
Active Immunization with Diphtheria Toxin—Antitoxin Combined with Diphtheria Bacilli. 2nd paper. W. H. Pads, A. Zingher.
The Rat as a Carrier of a Dysenteric Ameba. K. M. Lynch.
The Effect on the Offspring of Lead Poisoning in the Father. Editorial.
January 1.
Occupational Injuries Due to Radium. Report of Cases. Thomas Odway.
The Etiology of the Current Epidemic of Respiratory Infections in Chicago. A Preliminary Note. George Mathers.
Human Milk. Analysis of 24 hour Samples. Editorial.
Complement Fixation in Tuberculosis. Editorial.
January 8.
Program for the Promotion of the Physical Welfare of Children and the Prevention of Tuberculosis among Them. Sherman C. Kingsley.
The Epidemiology of Tuberculosis. F. C. Smith, M. D.
The Campaign Against Tuberculosis. Editorial.
The Rodent Problem of Cities. Editorial.

Medical Record, New York.

LXXXVIII. December 4.
Milk-Borne Septic Sore Throat—New Health Problem. H. M. Biggs.
Fermented Milk and Whey in Infant Feeding. A. E. Micklow.

Modern Hospital, St. Louis.

VI. January.
The Educational Function of the Hospital. Winford Smith.
Treatment of Hospital Sewage in an Individual Plant. P. E. Mebus.

The Nurse, Jamestown, N. Y.

January.
The Rôle of the Visiting Nurse. II. At Work in the District. Stella Fuller.
The Toothbrush and Floss Silk. Joseph Mead.
Disinfectants That Do Not Disinfect. Editorial.

New York Medical Journal.

CII. December 11.
The History of Pellagra. C. H. Lavinder.
The Epidemiology of Typhus Fever. J. F. Anderson.
Hookworm and Rural Sanitation. Editorial.
Tetanus and Vaccination Again. Editorial.
December 18.
Maternity Insurance. Lee K. Frankel.
The Need of a Division of Rural Sanitation in the State Health Department. Editorial.
Cancer Statistics.
CIII. January 8.
The Minor Communicable Diseases. S. W. Newmayer, M. D.
Smallpox and Quarantine. Editorial.
The Quick Detection of Spirocheata Pallida. Editorial.
January 15.
Increasing Mortality in the United States. Eugene L. Fisk, M. D.
Laundries and Disease Prevention. Editorial.

Safety Engineering, New York.

XXX, No. 6. December.
Means and Desirable Extent of Instruction to Workers in First Aid. J. M. Shields.
Standardization of Systems of Medical Supervision. J. W. Schereschewsky.

Social Hygiene, Baltimore.

II. January.
Prostitution and the Police. Raymond B. Fosdick.
Morals and Venereal Disease. Edward L. Keyes, Jr.
Syphilis as a Public Health Problem. A. J. McLaughlin.
The Municipality and the Venereal Disease Problem. George W. Goler.

The Public Health Journal, Toronto, Canada.

VII. January.
The Relation of the Medical Practitioner and the Public to the Cancer Problem. Chas. R. Dickson.
The Public Health Aspects of Alcoholism. Clarence Miller.
Preventive Philanthropy Improving Condition of the Poor at Long Range. C.-E. A. Winslow.
The Place of the Laboratory in Public Health Work. A. G. Nicholls.
The Attitude of the Federal Government towards Tuberculosis. George Porter.
Modern Methods of Sewage Disposal. The Late F. H. Johnson.

United States Public Health Reports.

XXX. December 3.
Hydrocyanic Acid Gas. Its Practical Use as a Routine Fumigant. R. H. Creel, F. M. Faget, W. D. Wrightson.
December 17.
Malaria—Malarial Fever—Recent Appearance at Galveston, Tex. L. P. H. Barenburg.
Public Health Administration in North Dakota. Carrol Fox.
December 31.
Vaccination—The Possible Convenience of Using Combined Vaccines Where Protection against a Number of Diseases is Desired.
Public Health Administration in Nevada. Carrol Fox.
XXXI. January 7.
Standards for Milk—Their Necessity to the Welfare of the Dairy Industry. John F. Anderson.
January 14.
The Practicing Physician—What He Should Know about the Registration of Births and Deaths and the Reporting of Sickness. John W. Trask.
Milk-Borne Typhoid Fever. F. C. Smith.

FOREIGN.

THE BRITISH EMPIRE.

British Medical Journal, London.

II. November 27.

Easy Method of Detecting S. Pallida and Other Spirochetes. A. C. Coles.

Simple Method of Cultivation of Anaërobic Organisms. L. Dimond.

December 11.

Prophylaxis of Tetanus. A. T. MacConkey.

Control of "Diphtheria-Bacillus Carrying"; and Jasmine Oil Method. W. Ewart.

Journal of the Royal Sanitary Institute, London.

XXXVI. December.

Maternal and Child Welfare. Philip Boobbyer.

The Final Report of the Royal Commission on Sewage Disposal. Samuel Rideal, J. D. Watson.

Water Supply. Reginald Brown.

January.

The National and Social Aspects of the Lowered Birth-Rate. Louis C. Parkes.

The Recent Epidemic of Cerebro-Spinal Meningitis in Salisbury. E. T. Fison.

Journal of State Medicine, London.

XXIII. December.

The Nutrition of the School Child. G. A. Brown.

Correlation of Health Work under the National Insurance Act, 1911. J. R. Kaye.

Journal of Tropical Medicine and Hygiene, London.

XVIII. November 27.

Notes on Certain Insecticides. A. Castellini, T. W. Jackson.

Inoculation of Smallpox as Prophylactic Measure as Practiced by the Natives of Djen in Nigeria. H. A. Foy.

Lancet, London.

II. November 13.

Zinc in Potable Waters. J. C. Thrush.

November 27.

Common Intestinal Protozoa of Man. C. M. Wenyon.

Recognition and Isolation of Meningococcus in Nasopharynx of Cerebro-Spinal Fever Contacts. J. McIntosh, W. E. Bullock.

Medical Officer, London.

XIV. November 27.

Maternity Mortality in Connection with Child-Bearing.

Difficulties Encountered in the Visitation of Tuberculosis Cases. A. E. Thomas.

December 11.

Scarlatinal Return Cases. John Ritchie.

December 18.

Significant Vital Statistics.

A Plea for the Early Use of Antitoxin in Diphtheria. Matthias Nicoll.

December 25.

Contaminated Water Supplies.

The Administration of Diphtheria Antitoxin for Curative Purposes. William H. Park, M. D.

January 1.

Sophistication of Milk Supplies.

Health, Heredity, and Environment. Sidney Davies.

Public Health, London.

XXIX. December.

Some Features of Sanitation in Semi-Permanent Camps. W. S. Stalker.

The Purification of Sewage from Camps. C. C. Frye.

The Family in Relation to Pulmonary Tuberculosis. W. H. Dickinson.

FRANCE.

Bulletin de l'Académie de Médecine, Paris.

LXXIV. October 19.

Bacteriologic Examination of Beer. L. Roussel and others.

October 26.

Mixed Vaccines against Typhoid and Paratyphoid Used in Northern African Colonies. E. Sergent, L. Nègres.

Vaccine Therapy by the Mouth against Typhoid. F. Trémolières, P. Loew, Maillart.

November 2.

Further Research on Vaccination against Paratyphoid. J. Ligniéres.

November 16.

Morphology of Typhoid and Paratyphoid Bacilli Cultivated in Human Cerebro-Spinal Fluid in Vitro. Deumezon.

November 23.

Discussion of Wording of Circular Warning Against Venereal Diseases. Letulle.

GERMAN EMPIRE.

Berliner klinische Wochenschrift.

LII. October 25.

Clinical and Bacteriologic Findings in Dysentery Plus Typhoid. M. Soldin.

Infectious Diseases in the Active Army. Grundman.

November 29.

Camp Diseases and Importance of Contact Infection. Menzer.

Deutsche medizinische Wochenschrift, Berlin.

XLI. October 14.

War and the Public Health. Gottstein.

Simultaneous Vaccination against Typhoid and Cholera. L. V. Lieberman, Ace

The Fight against Venereal Disease among Troops. Haberstaedter.

October 21.

Production of Immune Bodies by Various Typhoid Vaccines. O. Lowy.

October 28.

Bacteriologic Diagnosis of Cholera. Bottiche.

Exposure to Tuberculosis in Childhood as Factor in Tuberculosis Later. Bergman.

November 4.

Study of an Epidemic of Typhus. Otto.

Münchener medizinische Wochenschrift, Munich.

LXII. October 26.

Hygiene in the Camps of Prisoners of War. Seiffert.

November 9.

Bacillary Dysentery. Matthes.

Naphthalein for the Extermination of Lice. Lenz.

November 23.

Sterilizing Newspapers for Surgical Work. Rudiger.

Wiener klinische Wochenschrift, Vienna.

XXVIII. September 30.

Experiences with Typhus. Detre.

Technic for Production of Bacterial Vaccine. Lowy.

October 12.

Bacteriologic Diagnosis of Dysentery. Salus.

Prophylaxis of Venereal Disease at Close of War. Brandweiner.

October 21.

Vaccination against Dysentery. Hever and Lucksch.

November 4.

Skin Reactions Indicating Protection against Typhoid. Pulay.

November 25.

Industrial Skin Lesions in Workers on Munitions. Oppenheim.

Streptococcus Lacticus Enterites. V. Wiesner.